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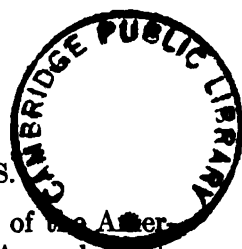
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AMERICAN STATISTICAL ASSOCIATION.

NEW SERIES, No. 81

MARCH, 1908.

ADDRESS OF CARROLL D. WRIGHT, PRESIDENT OF
THE AMERICAN STATISTICAL ASSOCIATION, AT
ITS ANNUAL MEETING IN BOSTON, JAN. 17, 1908.

At the meeting of this Association in April last it was decided that at this meeting, and perhaps at successive annual meetings, there should be a presidential address, and the present one is the first of that character.

It is appropriate, therefore, that I should indulge in a brief historical statement concerning the origin and work of the Association.

The Royal Statistical Society of London was founded March 15, 1834, but was not incorporated until Jan. 31, 1887. Whether the founding of the Royal Society inspired the organization of this Association I cannot say, but it is safe to assume that this was the case, for it was only a brief period after the organization of the British institution that a meeting was held at the rooms of the American Education Society, 15 Cornhill, Boston, Nov. 27, 1839, for the purpose of considering the expediency of forming a statistical society. The following persons were present: Hon. Richard Fletcher, Rev. William Cogswell, D.D., Oliver W. B. Peabody, Esq., Register of Probate, John D. Fisher, M.D., and Lemuel Shattuck, Esq. They organized with the Hon. Richard Fletcher as chairman and Lemuel Shattuck, Esq., as secretary.

After discussing the objects for which the meeting was called,

on motion of Rev. Dr. Cogswell it was resolved that it was expedient to form a society to be called the American Statistical Society.

A committee was appointed to prepare a constitution for the government of the society, to be submitted at an adjourned meeting, and all the gentlemen present were made members of that committee.

Dec. 11, 1839, all the gentlemen previously named being present except Mr. Fletcher, a constitution of the American Statistical Society was adopted. The object of the society was stated to be to collect, preserve, and diffuse statistical information in the different departments of human knowledge. After deliberation and discussion it was voted to adopt the constitution, and an adjournment was made until Dec. 18, 1839, when all the gentlemen named were present, together with Hon. Horace Mann, Dr. Samuel G. Howe, and Dr. Jesse Chickering. At this meeting the organization was perfected by the choice of officers, consisting of Hon. Richard Fletcher, President; Henry Lee, Esq., and Bradford Sumner, Esq., Vice-Presidents; Rev. Joseph B. Felt, Recording Secretary; Lemuel Shattuck, Esq., Home Secretary; Joseph E. Worcester, Foreign Secretary; Rev. William Cogswell, D.D., Ebenezer Alden, M.D., Oliver W. B. Peabody, Esq., John P. Bigelow, Esq., Hon. Horace Mann, John D. Fisher, M.D., Professor Bela B. Edwards, Samuel G. Howe, M.D., and Jesse Chickering, M.D., as Counsellors. At the next meeting, Jan. 8, 1840, there appeared the name of Dr. Webb.

It was voted that an application be made to the legislature for an act of incorporation. Feb. 5, 1840, the occasion of the annual meeting of the Association, the formation, progress, and purpose of the society and the public good it might do, if suitably conducted, was discussed by the President.

At this meeting it was voted on motion of the Directors—and I think we can discover the humor underlying this vote—that the name of the society be altered from that of the American Statistical Society to that of the American Statistical Association.

The officers were elected at this annual meeting, and the individual members were proposed as Fellows, Honorary, Corresponding, and Foreign Members.

By an act approved Feb. 5, 1841, the American Statistical Association was incorporated by the legislature of Massachusetts. Thus the new Association, full-fledged and authorized by law, was ready for its work of preserving and diffusing statistical information. It has always adhered to this provision of the act incorporating it. It has not gone into economic or social questions, philosophical or ethical science, but has adhered most rigidly to its statistical objects.

Up to date it has had a continued existence, there never having been a year since its organization that it has not held meetings and had papers of a statistical character, although its proceedings have not been regularly printed. It has had during the whole period of its existence of sixty-nine years but five Presidents: Hon. Richard Fletcher, 1839-45; George C. Shattuck, M.D., 1846-51; Dr. Edward Jarvis, 1852-82; Dr. Francis A. Walker, 1883-96; and the present incumbent, 1897 to date.

Dr. Jarvis served the Association thirty years as its President, and on the election of his successor, Dr. Walker, he was made President Emeritus.

With two exceptions three quarterly meetings, besides the annual meeting, each year were held from 1840 to 1879. Some of the meetings were omitted in some of the years, especially the July meeting, which, beginning in 1881, was omitted regularly. From 1894 on no quarterly meetings were held, with the exception of a special quarterly meeting on April 16, 1897, in memory of President Walker. Since 1899 until the present year no quarterly meetings have been held, but there has been no year in which meetings have been entirely omitted.

The proceedings of the society have not been published regularly. In 1847 the collections of the Association were brought together and printed, entitled Volume I., in three parts. In the first part there appears quite a valuable paper by Professor B. B. Edwards, of the Andover Theological Seminary.

Professor Edwards discussed the history and origin of statistics. There were other papers on the towns of Massachusetts in this first part, with a history of their origin.

Part two contained statistics of population in Massachusetts, prepared by Rev. Joseph B. Felt, while part three, published in 1847, contains statistics of taxation in Massachusetts, including valuation and population. This was also prepared by Mr. Felt, and was one of the first attempts at analysis of statistics by a member of the Association.

So far as I have been able to learn, papers in a desultory way were published from time to time, but no regular collection appeared until what we now know as the New Series, beginning in March, 1888, under the direction of Dr. Davis R. Dewey, and when General Walker was President of the Association. Since then the publications have appeared regularly, and they constitute a collection of exceedingly valuable statistical productions. In fact, I feel warranted in asserting that no statistical society has, on the whole, brought out a more valuable collection of statistical material, and the members of the Association can feel gratified that it has presented to the public so many carefully analyzed topics relating to the science to which we are devoted.

With this brief historical review, it is pertinent to discuss the field of labor of the Association, the condition of public statistics when it was organized, and the opportunity it has had for exerting its influence and for conducting its statistical investigations.

The scope of statistical inquiry when the Association was organized was not only very limited in quantity, but meagre and unsatisfactory in quality. The vehicle of statistical information, the federal census, had not reached encyclopedic proportions. The Association had as its field from which to draw the facts for its analysis the United States census from 1790 to 1840, the Colonial censuses, and those of one or two States, more especially the efforts of the Commonwealth of Massachusetts. A glance at the founders of our Association convinces one immediately that they were men who understood and com-

prehended both analysis and classification; that the analysis and classification of the facts relating to various conditions which surround the human race entered into their great object, and the purpose of social science at large, the chief object of which is to spread the knowledge resulting from the investigations of its movements, that the people may better appreciate and understand their own conditions and aid, by an increased intelligence, in the amelioration of unfavorable features and the eradication of positive evils.

They knew as well as social scientists and statisticians to-day that statistical methods—or statistical science, if you prefer—could evolve laws which should be applied practically to these great objects of social science. They felt that the time had arrived when something should be done outside the mere collection of data. They had an opportunity with the meagre efforts back of them for this purpose.

The United States instituted the national census in 1790. There are three periods to the American census, the Colonial, the Continental, and the Constitutional, or our present period. During the first period the British Board of Trade played an important part in American affairs, and it often attempted enumerations of the people of the colonies, but the census had not then assumed scientific form and definiteness in Europe, and, as would be expected, the results here were very imperfect. Superstition was an obstacle, but without obstacle success could not have been attained in the colonies when the mother country took her first census in 1801, and then so imperfectly that the results were of no immediate value.

During the Continental period, although resolutions in Congress had been introduced, no general enumeration of the population was secured. Various estimates and computations were made from time to time, but they came no nearer accuracy than those made in the Colonial period. It had, however, become clearly settled that there never could be a complete enumeration until the work was done by a central directing authority. It was left to the Constitution to give us first an enumeration

of population and afterwards a national census, primarily for the purpose of apportioning representatives and direct taxes among the several States included within the Union and according to their respective numbers.

This attitude of Congress caused an enumeration of the population in 1790, and from this has grown the national census. Perhaps the most impressive statement relative to this growth relates to the number of inquiries at the first and at later censuses.

At the census of 1790 there was one schedule, containing four inquiries. In 1840, when the American Statistical Association had just been organized, there were two schedules, containing 82 inquiries or details. In 1890, just one hundred years after the first census, there were 233 schedules, containing 13,161 inquiries or details. Reduced in 1900 to 7,476. Of course, in 1790 the 4 queries related to the members of the family, the people only, while in 1890 the inquiries did not apply to one individual, but they were all projected. This was the grand sweep of one hundred years.

In 1810 an attempt was made to collect data relative to manufactures. This was repeated in 1820, omitted in 1830, and taken up again in 1840, and has continued through all censuses since that time, but until 1850 the inquiries as to manufactures amounted to but little.

A start was made in agricultural statistics in 1840, and the work has been continued throughout.

There were Colonial censuses in the colony of Massachusetts in 1754-1765-1776. State censuses were ordered in 1837-1840 and 1850. The regular decennial enumeration of the inhabitants under State authorization was ordered taken in 1855 in connection with the collection of industrial statistics, and this has been taken since then, being the mean between the dates of the federal census. Thus Massachusetts has a census every five years, both of population and of industry. Some other States organized a census on the quinquennial period relative to the United States census, but, like the earlier State censuses of Massachusetts, they were of very little value except in se-

curing the aggregate population for the purpose of legislative representation.

The crudeness of these earlier censuses seems very strange to us, and yet they were creditable efforts on the part of the State governments authorizing the collection and showed a disposition to secure information on which to base conclusions and actions.

The first analytical survey of any of these works, so far as my observation warrants the statement, was by Lemuel Shattuck, the first Secretary of this Association, in a report to a committee of the city council appointed to obtain the census of Boston for the year 1845.

Mr. Shattuck, who drew this report for the committee, indulged in some very sharp criticisms of the federal census, and analyzed in a very creditable way the results of that particular census. Some of the members of the Association—and I regret that I have not been able to find the documents—dealt with the State censuses from time to time, and others, especially Dr. Jarvis, had much to do with inducing the federal government to expand its work, and in 1870 he analyzed some of the statistics of the federal census.

I do not know whether any of you ever knew Dr. Jarvis, but I knew him well, not only through my association with him in this organization, but by his frequent visits to my office to discuss statistical questions. He was very fond of relating some of the amusing things he found in the federal census. On one occasion he found the case of a man something over eighty years of age who had died of teething, and a child a few months old who had died of old age. Of course there was a transposition in the statements, but it amused the old doctor immensely and he never tired of relating the anecdote.

The first census, as I have said, which really amounted to an attempt at scientific work was the federal census of 1850. It was better in some respects than the succeeding one of 1860. In 1870 General Walker was put in charge, and the census of that year was an enormous improvement over that of 1850; but it was just prior to 1880 that General Walker submitted

to Congress a bill providing for the tenth census, and it was through an extension of inquiries of far-reaching importance that the census of 1880 became known as the encyclopedic census of the United States.

It attracted the attention of the leading statisticians all over Europe and gave the United States a position in statistical work that it had never held before. It should be remembered that the United States was then the only government collecting industrial statistics of any kind,—that is, the products of agriculture and manufactures,—and it is to-day the only State in the world that does this character of work.

We hear of industrial censuses in Europe, but they relate only to occupations, although some attempt has been made to secure statistics similar to those collected here. While the British Parliament rejected time and time again a bill relating to statistics of production, as it was feared that much trouble would ensue, yet last year a law was passed for a decennial census of English manufactures, and the work is now in progress.

The United States is therefore the leading country. Its population schedule embraces many more inquiries than that of any other census office, and it expands its work to cover all conceivable valuable data.

The first State censuses to command any attention and which can, by any stretch of terms, be considered as scientific, were those of New York and Massachusetts in 1875. The New York census of that year was a most excellent one. The census of Massachusetts I do not feel at liberty to speak of extensively, but in bulk, anyhow, it surpassed any of the State's previous publications. A small volume had contained the results of previous censuses. It took three volumes to report the census of 1875; four volumes (and thick ones at that) to report the census of 1885, and seven volumes (large quarto) to get the results of the census of 1895; and I do not know how many volumes it will take to cover the work of the census of 1905,—they are not out yet.

The Association had at its start, as I have said, a very narrow field from which to gather its material. We did not have our

fine registration reports, nothing on agriculture, nothing on insurance, nothing on savings-banks, nothing except the meagre census reports to which I have alluded.

Mr. Felt in his paper to which I have referred, and which was delivered before the Association in 1843, gave a brief account of what was being done at that time in foreign countries. He speaks of the Royal Statistical Society as having been founded in 1834 in pursuance of a recommendation of the British Association for the Advancement of Science. But it could not deal with the great questions which belonged to it. It had little or no information on which to base its conclusions. In fact, I have wondered many times how writers back of 1850 at least could bring out their positive deductions, as Adam Smith, for instance, when he wrote his "Wealth of Nations," seems to have had a vast amount of information, but where he got it is difficult to say.

And so it was all along the line. The Royal Society undertook to meet this great want. It appointed committees for the purpose of procuring and collecting information in respect to various strikes and combinations which existed for the purpose of altering the rate of wages. And it had a committee whose sole duty was to perfect the statistics of life, relating to births, deaths, marriages, and population.

Mr. Felt says that "in the United States but little attention has as yet been given to the subject of statistics, that the attempt has never been made to present a complete view of either of the great departments of this interesting and practical science." He refers to the meagre attempts of the Patent Office and to some of the individual States, the reports of the School Commissioners of New York and Massachusetts, and to a few isolated individuals who have labored in the statistical field with great assiduity. They had to fall back largely on information contained in Warden's "Statistical, Political, and Historical Account of the United States," Timothy Pitkin's "Statistical View of the Commerce of the United States," Adam Seybert's "Statistical Annals," William Darby's "Historical, Geographical, and Statistical View of the United States," and

Watterston and Van Zandt's "Tabular Statistical Views." And he goes on to say that "it is in this interesting and comparatively uncultivated field that the American Statistical Association propose to labor with such means as may be placed at their disposal, with the co-operation of kindred societies which may be formed, and with the aid which may be expected from our National and State governments. It is obviously a field of vast extent, and rich in materials for collection and comparison."

And yet we see how meagre the field was; how rich it is to-day in comparison with what it was when our Association was organized.

But the field has been enriched in various lines other than census taking. While the census offers the greatest field for exploitation by associations like our own, there are other fields now that were not contemplated by the organizers of this institution.

Every State publishes annually a great number of statistical works. These comprehend the statistics of the great elements of business and industrial and social life. A student who undertakes to examine any line of State statistical works finds himself involved in a mass of facts and deductions almost impossible to analyze or classify. As the States have grown, their interests have expanded, and these interests have demanded the facts relative to State activities. So we have statistics of insanity, pauperism, insurance, banking, railroads, great manufactures, statistics of everything, in fact, that relate to the activities of the people,—births, deaths, marriages, and now divorce,—everything, as I have said, that relates to the activities and social environment of the people.

The federal government, in addition to the work of its census, sends out every year numerous volumes containing the most valuable statistical information on the finances of the country, immigration, shipping, the carrying trade, commerce, Indians, and patents, and many other lines of important statistical information.

In 1869 there was instituted here in Massachusetts a new

era of statistical work. This came through the establishment by the legislature of the Bureau of Statistics of Labor. After a few years of work other States established similar offices, often with different designations, but, as a rule, under a law providing substantially what the law of Massachusetts provided for the Bureau of Statistics of Labor. There is now a chain of these bureaus extending from one end of the country to the other, numbering, I believe, 34 offices, while in 1884 the federal government established a similar office which was organized in 1885.

As near as I can calculate, the reports of this chain of bureaus number something like seven hundred volumes, and they constitute a vast storehouse of social and industrial information, some of the volumes not very good, but most of them of an excellent character. They here and there show the lack of a power of analysis and classification, but on the whole, with one or two exceptions, they are honest reports. And I think, too, there has been but one spirit pervading the heads of this great chain of offices. That spirit has dominated the work everywhere, and even when the head of such an office has been appointed for purely political reasons the incumbent has soon realized the sacredness of his office and he has learned that to tell a statistical lie is the most harmful thing a man can do. He becomes inspired with the idea that he must tell the truth.

In this connection I cannot deprive myself the pleasure of relating an experience of mine. I took charge of the Massachusetts Bureau in June, 1873, and on doing so I sought the advice of General Francis A. Walker, adopting for my guide the sentiments contained in his reply, and I believe I can do a service by quoting it in full:—

Dear Sirs,—I have given much thought to the letter in which you do me the honor to ask me my views as to the work of the Massachusetts Bureau of Labor Statistics; but, as the result, I find but little to say beyond expressing my hearty sympathy with the purposes of your office and my wishes for its success. I feel the strongest confidence that the Commonwealth is prepared for your work, and that the work can be done to the satisfaction of all citizens; and that your office has only to

prove itself alike superior to partisan dictation and to the seductions of theory in order to command the cordial support of the press and of the body of citizens. If any mistake is more likely than others to be committed in such a critical position, it is to undertake to recognize both parties as parties, and to award so much in due turn to each. This course almost inevitably leads to jealousy and dissatisfaction. If an office is strong enough simply to consider the body of citizens and to refuse to recognize or entertain consideration of parties, success is already in the main assured. Public confidence once given, the choice of agencies, the selection of inquiries to be propounded, are easy and plain. The country is hungry for information; everything of a statistical character or even of a statistical appearance is taken up with an eagerness that is almost pathetic; the community have not yet learned to be half sceptical and critical enough in respect to such statements. All this is favorable to such laudable efforts as you are engaged in, for the difficulty of collecting statistics in a new country requires much indulgence; and I have strong hopes that you will so distinctly and decisively disconnect the Massachusetts Bureau of Labor Statistics from politics, from dependence on organizations, whether of workingmen or of employers, and from the support of economical theories, individual views, or class interests—as to command the moral support of the whole body of citizens and to receive the co-operation of all men of all occupations and of all degrees, without reference, however, either to their degrees or their occupations.

The time had arrived when the public was, as General Walker states, hungry for statistical information and adopted it pathetically. I think it was this attitude of the public that enabled this great chain of bureaus to meet with success. The rigid and religious observance of his precepts enabled the Massachusetts Bureau to set an example followed, as I have said, by thirty-four States and the federal government, and now it has been followed by every civilized country in the world. I do not think of any government that has not established a bureau founded on the lines of the original Massachusetts office.

And yet it was something different from hunger for statistical information that caused the Massachusetts office to be established. In the legislature of that year—1869—there were petitions for the incorporation of the Knights of St. Crispin. The petitioners were given leave to withdraw.

There had been for three or four years recommendations by

one commission after another for the establishment of a bureau whose sole duty it should be to collect statistics relating to industrial conditions, etc. Nothing had come of them. The rejection of the petition of the Knights of St. Crispin caused the members of the legislature towards the end of its session to become aware of the fact that a political mistake had been made. They could not take up the petition again very well and incorporate the Knights of St. Crispin, so all at once a bill was introduced providing for the establishment of a Bureau of Statistics of Labor, and this bill was carried through very promptly and rapidly under a suspension of the rules, the members of the prevailing party in the legislature having an idea that by doing this they would appease the labor element, especially the Knights of St. Crispin, which was very strong in those days. The result politically was not satisfactory, but by this action the legislature of Massachusetts set the pace by feeding this hunger and appeasing the pathetic appeal for statistical information.

What constitutes the great difference between the statistics of the present time and those of forty or more years ago? Statistics have been called "dry bones." Mr. North, in an address a few years ago, stated that statisticians resented this popular idea about the dry bones of statistics, that there is nothing dry about them, that they are moist, juicy, fragrant as all the "perfumes of Arabia." They are more poetic than poetry, more artistic than art, more musical than music, more philosophical than philosophy. He thought then, and I think he is of the same opinion now, that the temptation to weave romances out of statistics is so strong that some so-called statisticians are wholly unable to resist it, and this is mainly true.

This romantic idea leads to what we know as the statistical mechanic, the man who is ready to construct tables to order. Yet the real statistician, the man who is working out the process of making them, does not make tables to order, but he puts an integrity and devotion into his work that is not surpassed in any other line of official conduct.

The spirit of the modern statistician lies in the precepts laid

down by General Walker and in the fact that there is something deeper and more comprehensive than the mere statement of figures, for the statistician must have the spirit of what again Mr. North has called ethical philosophy, the recognition of the existence of the great fundamental law, the principle which governs this world and all things in it,—the principle of evolution.

How perfectly true this is, and how absolutely lacking was this spirit at the time of the organization of this Association! The modern statistician makes statistics popular by presenting their results in popular and readable form. The official statistician is under limitations in this respect, for his work, no matter what his spirit is, must, to a certain degree, be conventional, for it must be official in its character; but the Association to which we are devoted can put this spirit into its work in interpreting the statistics of the government.

The field for our exploitation is vast and rich, and it is growing vaster and richer as time goes on. We now have what we have long needed, a permanent census office, a great clearing house of federal statistics, and more and more Congress will use it as the vehicle for sending out to the people its costly information. Not only this, but more and more will it consolidate into the Census Office other statistical works, so that there shall be harmony in preparation, unity and science in presentation.

The United States now holds a unique position in statistical work. As I have intimated, no other country approaches it. Any one who has given any consideration whatever to the volumes and bulletins which are coming out of that office must concede this fact, and feel proud every time that such a volume is examined that we not only now have an office competent, adequate, skilfully manned to make it a great clearing house of statistical information, but that we have a man, one of our own Vice-Presidents, at the head of it who comprehends that spirit to which I have alluded,—who has the judgment, the intellect, and the ability which makes him pre-eminently the peer of any statistician the world can name, and holding a field

and having an opportunity not even approached by any other statistician on earth. He understands clearly the duty to which he is assigned. He understands not only the present scope of his work, but what it may be made to reach in the future.

He knows that he is painting a grand and enduring picture, not in bright colors mixed and laid by an artist's hand on canvas which might not tell at the close of another century of the work of our generation, nor yet in glowing words of description by sentences constructed by most gifted writers, whose language one hundred years hence might not mean all the interpretation we give it in our time, nor in any of the perishable methods which convey to posterity as much of the vanity of a people as of the reality which makes the Commonwealth of to-day; but that he sets the picture in cold, enduring Arabic characters, which have survived through the centuries that have passed, unchanged and unchangeable by time, by accident, or by decay, and will remain through the ages to come as truthful as of old. They are the symbols that have unlocked to us the growth of the periods which make up our past. They are the fitting and never-changing symbols by which to tell the story of our present state, so that, when the age we live in becomes the past of successive generations of men, the story and the picture shall be found to exist in all the just proportions in which it has been set by ourselves. A quiet and may be unlovely setting the statistician chooses, but he knows it will endure through all time.

At the close of the address of the President, Dr. Samuel W. Dike said:—

This address has noted the many State Bureaus of Labor (34 in all, I think) besides the National Bureaus that have grown out of the Massachusetts Bureau of Labor Statistics. Mr. Wright, I believe, might have also mentioned two or three important European Statistical Bureaus that owe their origin largely to our Massachusetts Bureau. I happen to have heard from excellent authority many years ago the story of the

way in which the Massachusetts Bureau was saved from impending extinction and started on the road to success. The briefest statement of an incident will give you the clue. The Massachusetts Bureau had dragged along for three or four years, and seemed to be on its last legs. Governor Washburn sent for Colonel Carroll D. Wright, then a young man scarcely rising above thirty years of age, who was completing his term of service in the State Senate, and said to him, "I have watched your work on some measures before the legislature, and now I want you to take this Bureau of Labor and make it or bust it!" After considerable urging on the part of the governor, the young man, who was intent on returning to his excellent law practice and was without statistical experience, consented.

THE OUTLOOK FOR STATISTICAL SCIENCE IN
THE UNITED STATES.*

BY S. N. D. NORTH.

I am glad of the opportunity to supplement President Wright's interesting retrospect with a brief allusion to the present situation and the future outlook for statistical science in this country, and more especially in relation to the statistical work of the government.

I have but one criticism to make upon the address. It resembles the play of "Hamlet," with Hamlet left out. It nowhere hints that Colonel Wright has contributed more to the development of statistical work in the United States, and to its substantial advancement along straight and sane lines, than any other living American. Colonel Wright could not say all this, but I can.

We cannot yet fully realize what a tremendous step forward was taken when the Census Office was made a permanent institution by the act of March 6, 1902. No single thing, save only the requirement for a decennial census in the Federal Constitution, has done so much to promote the study and to perfect the methods of statistics as that legislation, to which Congress consented with the utmost reluctance and with much misgiving.

It will only be after a decennial census has been taken that we can measure the gain that must come in the quality of the work by reason of the existence of the permanent bureau. That the gain will be tangible and real we already know; for a large part of the work of the office has been concentrated during this interval upon a study of weaknesses and defects and upon plans for strengthening the machinery and improving the methods.

* Address delivered at the annual meeting of the American Statistical Association Jan. 17, 1906.

The bill already introduced in Congress for the taking of the thirteenth census is the first visible result. The bill has received a more careful study by the best statistical experts than was ever before given to a census law.

I believe it has but one serious defect: that is the provision for the appointment of the temporary clerical force after non-competitive examinations rather than through the usual civil service method. The Director ought to be wholly relieved, during the progress of the tremendously difficult work of a decennial census, of all pressure for patronage.

We hope to see it enacted at the present session of Congress. This will be a year earlier than the usual date of census legislation heretofore. This additional year for preparation, by the complete organization of the working machinery, kept alive at its highest efficiency, means a good job, more deliberately and carefully done than was ever possible before.

There has been much speculation as to the margin of error in past censuses. It is customary to reassure the doubters by the statement that one error tends to offset and balance another, giving a net result sufficiently near the truth for all practical purposes. I have always been sceptical as to the soundness of this reasoning. At the next census we may make some discoveries that will be startling. At any rate, we are for the first time in a position where we can intelligently check one census with another.

The permanent Census Office has created a training school for government statisticians. Many of you will recall the remark of General Walker in 1896, that "the government which has spent millions and tens of millions in the collection, compilation, and publication of statistics, had never spent anything in training and preparing the men who should conduct the statistical work of the country." We have an army and a military academy to train men in military science, a navy and a naval academy to prepare men to conduct the service of the navy in war and in peace; but for the development of the science of statistics, the science whose light guides and directs the action of legislature in the shaping of policies that

are to determine the future of the nation, we have simply taken our chances, with a resultant waste which is appalling and an impairment of the validity and accuracy of official statistical data even more appalling.

The permanent Census Office is destined to be our statistical West Point. Already more than twoscore of the best census clerks have gone into other bureaus and departments of the government to engage in various statistical investigations in connection with administrative work,—to the Bureau of Corporations, of Manufactures, of Forestry, of Labor, and various bureaus of the Department of Agriculture. These statisticians have received a severe and exacting training. Every table or statistical presentation prepared in the office undergoes a merciless criticism and analysis before it reaches the printer. It must be defended, proved, and justified, or be sent back for reconstruction. No university subjects a thesis to more drastic criticism. Most of the clerks who go out after such a training can be trusted to make the most of it in their new fields. I am proud of the record that census-trained clerks are already making in other branches of the government service.

Others have gone into important private posts, still others to State statistical bureaus, and others still to the colleges and universities.

One of the most notable recent developments in higher education is the introduction of the study of statistics as an adjunct to the courses in Political Economy. I know of half a dozen institutions where well-organized statistical courses exist, and no doubt there are more. Many of these university teachers of statistics maintain intimate relations with the Census Office. It is a source of pride to us that census reports are in regular use as text-books.

The relations of the university and the Census Office should be even more intimate than at present. What we now most need is the friendly criticism and suggestion of the trained men, who, through constant use of census reports, come to know their defects. The producers and the consumers of

statistics should be in constant sympathetic co-operation. Helpful suggestions have already come from the consumers. But there should be more of them. There should exist the feeling among the teachers of statistics and of statistical methods that the federal Census Office is not only intended for their use, but is in a large degree dependent upon them for the development of its work along right lines.

Especially should this relationship exist between the Census Office and the American Statistical Association, the one organization in this country whose members are vitally concerned in the work set for us to do. Statistics are your tools. Help us, by friendly criticism and constant suggestion, to keep your tools keen-edged and well tempered, to establish a true standard gauge for the accurate measurement and comparison of the wonderful and multifold conditions of American development.

This is the more important because the Census Office is rapidly coming to be recognized as the general information bureau of the government. The correspondence of the bureau, involving inquiry of one kind and another, is enormous. Fully one-half of it is referred to the census from some other bureau or department. This fact illustrates the confusion which exists in the public mind as to where to apply for statistical information from the government. The statistical work has heretofore been so divided up and the names of the bureaus have been so misleading that the public is utterly at a loss. Letters are sent hit or miss, and the red tape of circumlocution is appalling. For instance, we have a Bureau of Manufactures in the Department of Commerce and Labor and at the same time a Division of Manufactures in the Census Office. The latter takes a complete census of manufacturing industries every five years, and alone can answer the bulk of the inquiries which pour in upon the Bureau of Manufactures. We have a Bureau of Statistics in the Department of Commerce and Labor, which deals only with the statistics of foreign and domestic commerce, and gets thousands of letters which must be referred to the Census. To make confusion more confounded, we have another Bureau

of Statistics in the Department of Agriculture. This bureau is of course concerned only with agricultural investigations, and even in that restricted field it deals not with actual statistics, which only the Census Office compiles, but with yearly crop estimates, which, it is needless to add, are totally different from statistics.

There thus exists a veritable babel in the designations of the bureaus that handle government statistics. This confusion is the outcome of a gradual but disjointed and haphazard development, which was the natural consequence of the fact that prior to the establishment of the permanent Census Office there existed no general statistical bureau to which the accretions of statistical work could appropriately be attached. It is a situation almost grotesque, but one which will gradually right itself. I am glad to be able to inform you that the present Secretary of Commerce and Labor has the problem under consideration, and is about to take an important step for the simplification and clarification of the existing confusion. The law which established the department of Commerce and Labor recognized the fact that this department was to become the chief statistical department of the government. With that end in view it conferred upon the Secretary unusual powers for the consolidation and rearrangement of statistical work. I believe this power is about to be exercised by Secretary Straus in a wise and effective manner.

It is of the utmost importance, in my judgment, that a definite apportionment of the responsibility for the government official statistics should be made. I cannot overstate the need for it, as it is revealed in the daily routine of the Census Office. The daily correspondence confirms another remark of General Walker; *i.e.*, "The American people are intensely and passionately devoted to statistics." They make more frequent use of them, perhaps, than any other people; and, of course, they subject them to every possible misuse. It is their too frequent habit to accept any figures presented in tabular form as "statistics," and to jump at the obvious conclusion. I regard it as no minor function of the permanent Census Office to act as a

check upon this vicious habit. It is immensely important that there shall be an official "hall mark" upon statistical publications: far more important than in the purchase of articles of gold or silver, the value of which is of interest only to a few individuals. It is a part of the duty of the Census Office to furnish the "hall mark" wherever it can and to decline to furnish it wherever it must. There should be some national criterion for all statistics which are labelled "official." This is a function of the permanent Census Office which, so far as I know, has not hitherto been suggested.

By the wise, impartial, and conscientious exercise of this function the standard of statistical accuracy will be materially advanced and the indiscriminate or perverted use of statistics, or of figures purporting to be statistics, greatly restricted. The trust thus imposed upon the Census Office is a grave responsibility. It would work an incalculable injury to the cause of statistical science if anything should happen to impair public confidence in the integrity and reliability of the census; and it is one of the best traditions of this office that its reports should point out and emphasize the limitations and sources of error in the statistics which it compiles, and thus guard against their misinterpretation.

Now a word as to the practical utility of the Census Office during the intercensal years. It makes for more exact statistics to concentrate the statistical work of the government, so far as practicable and wherever separated from administrative functions, in one central bureau, under one general supervision, and with a general unity of method. There must always be exceptions, as in the case of financial statistics, which the Treasury must compile. But what we may call the general, non-administrative statistics of the government—statistics collected primarily for the sake of the knowledge they give of general sociological and economic conditions—can always be handled to the best advantage in one office, whose business it is to do nothing else, which has no executive functions, which is under constant spur to do this one thing better and better, which can measure and test the results secured in one branch of statistical

work by those obtained in others, and can co-ordinate, unify, and verify the whole.

This last is an extremely important consideration. If I should seek the one word which best describes the most useful function of the permanent office, I should call it the standardization of official statistics; and you will permit me briefly to illustrate what I mean. One of the great defects of the statistical work of the government has been not merely the duplication of statistics, but the inconsistency and discrepancy which have existed between statistics on subjects closely related, emanating from different bureaus of the government.

Not all the duplication has disappeared, but it has been greatly curtailed since the establishment of the permanent office.

The inconsistencies and discrepancies have been still more reduced; and the federal statistics harmonize with each other more nearly since the permanent office came into being than ever before. There is still much to be done in this way; and I esteem this one of the most important functions of the permanent office.

The plan pursued to this end is very simple. It rests upon the proposition that the Census Office is a sort of general statistical clearing house for the government. There is hardly a point at which its work does not come in touch, more or less close, with the statistical work done by other government offices. Wherever and whenever this contact arises, it is the policy of the Census Office to get into touch with that other office, and by co-operation, study, comparison, to bring the joint results into harmony.

The statistics of gold and silver production, as compiled by the census, the Mint, and the Geological Survey, now harmonize; and they are more accurate than ever before, because their compilation has had the benefit of the combined knowledge, facilities, and experience of all three offices.

The statistics of imports and exports have been so reclassified that they harmonize with the census statistics of manufactures, and it is now possible to determine, for every great line of manufacture, with each recurring five-year census, just what

proportion of the product is exported and what proportion consumed at home.

The annual statistics of the lumber cut, required by the Forest Service, are now compiled by the Census Office in co-operation with the Forestry Bureau, and harmonize with the five-year censuses of the lumber industry. The statistics of fisheries are compiled in co-operation with the Fish Commission. A close working arrangement exists between the census and the Inter-State Commerce Commission in the compilation of the statistics of transportation. In agricultural statistics the Census Bureau and the Bureau of Statistics of the Department of Agriculture now interchange information and work together instead of seeking to discredit each other's figures, as was formerly the case. The Geological Survey and the Census Office unite in collecting the statistics of mining. Arrangements are pending for similar co-operation with the Bureau of Education. I might illustrate by a number of additional instances.

Until there was a permanent Census Office, this co-ordination and correlation of government statistics was impossible, because there was no bureau of the government whose business it was to bring it about.

Curiously enough, it is a reason for the existence of a permanent office which was not even thought of when the bill for its establishment was under consideration in Congress.

But it is not alone in federal statistics that this good work is progressing. The Census Office is in more or less intimate touch with the statistical bureaus of all the States; and the work of standardizing their schedules of inquiry and their presentation of data has made rapid progress.

Quite as important is the census work in the standardizing of vital statistics. The United States is behind, and far behind, every other great civilized nation—including Japan—in the field of vital statistics,—the field that touches the people most closely because of its intimate relation to the public health. As to births, we have no registration whatever of which any effective use can be made. As to deaths, but few of the States

have possessed effective registration laws until recently. Formerly the laws differed widely in scope and requirement, and the returns under them were impossible of scientific classification. In the brief interval since the census has been at work in this field, it has secured the adoption of its "standard certificate" of deaths in practically the entire registration area, thus making it possible, for the first time, to accurately judge the health conditions of one community by comparison with those in others. No single step ever taken by a federal bureau meant so much for the future physical welfare and sanitary protection of the American people as the successful introduction of this "standard certificate." If we had done nothing else, we would still have justified our existence by this single achievement. Moreover, largely as the result of an earnest propaganda by the Census Office, the number of States and cities in which effective registration laws are efficiently administered has greatly increased. These States and cities contained a population of 30,765,618 in 1900, or 40.5 per cent. of the total population: now they represent a population of 36,846,981, or 48.5 per cent. of the total. We are hopeful that at least two great States of the Middle West will be added during the present winter.

A third field in which the census is blazing the way to standardization is that of public accounting. Confusion worse confounded exists in the methods of book-keeping which now prevail in State, city, town, and county governments. In whatever direction we turn, we find an absence of uniformity, a lack of system, a confusion of methods, which originated in the separate organization of independent States and independent communities within the States. The progress of our own peculiar civilization is conditional upon the gradual unification of these diverse and conflicting statutory and administrative anomalies in the book-keeping of public finances. The most prolific source of municipal graft, its securest hiding-place, its most effective agency in seeking immunity, is the chaos existing in municipal book-keeping and in the classification of municipal accounts.

To each of the 157 cities of the United States having a population of 30,000 and over, a representative of the census goes every year, and so classifies the receipts and expenditures for every purpose that each city now knows just what it costs, in comparison with the cost in other cities of its class, to maintain schools, police, fire department, streets, sewers,—every important item of municipal expense. This is a magnificent work, furnishing a most effective weapon in the crusade for municipal reform and rehabilitation now sweeping over the United States.

These are some of the directions in which the permanent Census Office has already been able to lay the foundation for the standardization of official statistics. Our plans contemplate the unification of these statistics at every point where the work of the census touches the statistical work of any bureau, board, or commission in any State, city, or county throughout the United States. To lead the way, by example, by co-operation, by advice, in reducing the huge mass of ill-arranged and discordant State and municipal statistics to an orderly and comparable basis, is a most important function of the permanent census.

These things make me confident that the outlook for statistical science, in its application to government work, is full of promise and encouragement. A definite, well-directed movement for the standardization of official statistics is under way, and has already made rapid progress. I believe this movement, in its far-reaching, practical results, to be the most important work now in progress in the government service. It needs the co-operation, encouragement, and active assistance of every one interested in statistical science. It has only just started; but it has got a good start, and it must not be permitted to go wrong. Goethe was not quite ready to admit that "figures govern the world." But, if not true in his day, it is becoming true as time passes. In the kind of problems with which modern government has to deal, a column of figures may prove more potent than a column of soldiers, and a statistical table may exercise more influence than a flotilla of battleships!

AN INTERPRETATION OF CERTAIN STATISTICAL
EVIDENCE OF CONCENTRATION OF WEALTH.

BY G. P. WATKINS, PH.D.

The growth of large fortunes, both in number and in size, is matter of common observation. It is so obvious a fact that we do not need statistics to prove it. In order to measure the strength of such a tendency, it is true, we need statistics, and statistics of such a kind as are very difficult to get.

That property is undergoing concentration seems to be a proper inference from the admitted fact of the growth of large fortunes. The assumption involved in this inference is that the amount of wealth possessed by the people as a whole remains about the same, or the same per capita. Under such circumstances, if there are more who have much property, then those who formerly had little must now have still less. The assumption needs only to be made explicit in order that the unsatisfactory basis of the inference as to concentration be evident.

That the increase in the absolute number of large fortunes along with a corresponding increase of population is of no significance is too obvious a fact to require more than passing mention. The significance of an increase of wealth more than in proportion to the increase of population (that is, an increase of per capita wealth) is not so readily perceived.

Per capita wealth is known to be increasing. If so, and if there be no change in the character of its distribution (that is, if there be no tendency either to concentration or to the opposite), large fortunes must be increasing proportionately along with small properties. As per capita wealth increases, even though there be no tendency to concentration, the number of men worth \$100,000 or \$1,000,000 or any other given absolute

amount should be expected also to increase. People ordinarily think of a "large fortune" as some more or less definite absolute amount. If the words be given this meaning, then increase of large fortunes evidently does *not* involve concentration of wealth. We should expect the number of large fortunes to increase not merely as population increases, but also on account of the increase of per capita wealth. Since per capita wealth has been increasing in the United States, we should expect the ratio of millionaires to population to increase. The fact that this ratio has increased does not prove concentration of wealth. For the same reason, neither does the fact that our greatest fortunes to-day are larger than were those of a generation ago.

We may look at the question in a different way. We may say that a man is rich when he has 100 times the average or per capita amount of property of his countrymen, and that he is very rich when he has 1,000 times the average property. According to this definition, if per capita wealth be \$500, any man who has as much as \$50,000 is rich. But, if per capita wealth be \$1,000, a man must have \$100,000 to be rich. This, I think, is the better way to define the "large fortune." The idea should be that of a *relative* quantity. Men's ideas of "middle" and "upper" economic classes are certainly relative. If we assume that the growth of large fortunes and the concentration of wealth go together, we must take the term in its relative signification. Ordinary usage is of course ambiguous, not being clearly thought out. Taking the phrase thus relatively, we find it is *not obvious* that "large fortunes" have increased in importance in the United States in the last one or two generations. It may be so. But it is not the kind of conclusion that can well be based upon mere observation. The proof of concentration of wealth is a difficult and technical statistical problem.

An obvious and apparently the usual method of interpreting statistics of fortunes or incomes classified by size is to compare the per cents. of number in the several classes at the different

dates and also the per cents. of property possessed by the several classes. An objection to such procedure is that the uppermost class has no upper boundary, though this criticism is met in part where per cents. of amount of property as well as of numbers of owners are used. To be complete, the scheme should also include a class without property; classes should be of comparatively small range. But there still remains the fundamental objection that such classes, as they have been used, are bounded by absolute and fixed amounts, while concentration is a fact of relation. The boundaries of the classes should themselves be relative numbers, and should change with the per capita of the total amount of fortunes. If wealth classes are to be employed, the dividing lines should be at multiples of some sort of an average.*

The essence of the following attempt to interpret statistics relating to concentration of wealth is its use of thoroughly relative criteria. Another important difference from usual methods of treatment consists in keeping this question as to concentration of wealth separate from the other and larger question as to the character and tendency of the distribution of incomes, including thus incomes from labor. Special attention is given also to the *peak* of the pyramid of fortunes. One reason for this—in addition to the peculiar interest of that aspect of the question which relates to the growth of great fortunes—is the difficulties met in trying to obtain tolerable statistics of small properties, as distinguished from small incomes.

To test for a tendency to concentration of wealth, probate and inheritance statistics are the best available material. There is an assumption involved in the use of such material. But it is a fair assumption that any considerable influence affecting the degree of concentration of wealth among the living will soon affect in the same direction the distribution of property in the estates of deceased persons. In other words, the errors are constant and do not affect tests of *tendency*.

* For an extended discussion of this rather technical subject of the method of measuring concentration of wealth, the reader is referred to articles by Messrs. Lorenz, Holmes, and Watkins, Publications American Statistical Association, Nos. 70, 71, 72.

The best evidence we have for the United States bearing on the question under consideration is certain probate statistics compiled by the Massachusetts Bureau of Statistics of Labor. Following are the important primary tables:—

PROBATES IN MASSACHUSETTS: NUMBER AND AMOUNTS, AND THEIR PERCENTAGE DISTRIBUTION, 1829-31.*

	Number.	Per Cent.	Amount.	Per Cent.
Under \$500	1,431	38.7	265,544	1.8
500- 1,000	463	12.5	339,008	2.3
1,000- 5,000	1,274	34.5	3,022,264	20.9
5,000- 10,000	295	8.0	2,005,832	13.8
10,000- 25,000	157	4.2	2,426,465	16.8
25,000- 50,000	42	1.1	1,477,132	10.2
50,000-100,000	25	.7	1,829,147	12.6
100,000-200,000	6	3	805,464	21.6
200,000-300,000	2		640,063	
300,000-400,000	1		415,371	
400,000-500,000	2		1,267,817	
500,000 and over				
Totals	3,698	100.0	14,494,107	100.0

Population in 1830, 610,406.

PROBATES IN MASSACHUSETTS: NUMBER AND AMOUNTS, AND THEIR PERCENTAGE DISTRIBUTION, 1859-61.†

	Number.	Per Cent.	Amount.	Per Cent.
Under \$500	1,485	21.5	346,650	.7
500- 1,000	960	13.9	697,132	1.3
1,000- 5,000	2,827	40.9	6,791,881	12.8
5,000- 10,000	797	11.5	5,506,369	10.3
10,000- 25,000	507	7.3	7,787,931	14.6
25,000- 50,000	168	2.4	5,859,918	11.0
50,000-100,000	92	1.3	6,389,261	12.0
100,000-200,000	52	1.2	6,703,226	37.3
200,000-300,000	18		4,275,242	
300,000-400,000	7		2,386,964	
400,000-500,000	3		1,423,568	
500,000 and over	6		5,088,652	
Totals	6,922	100.0	53,256,794	100.0

Population in 1860, 1,231,066.

* The absolute numbers are from the Twenty-fifth Annual Report of the Bureau of Statistics of Labor, Massachusetts, 1894, p. 265.

† *Ibid.*, p. 267.

PROBATES IN MASSACHUSETTS: NUMBER AND AMOUNTS, AND THEIR PERCENTAGE DISTRIBUTION, 1879-81.*

	Number.	Per Cent.	Amount.	Per Cent.
Under \$500	1,822	16.3	446,576	.3
500- 1,000	1,451	13.0	1,047,946	.8
1,000- 5,000	4,588	41.2	11,275,295	8.2
5,000- 10,000	1,421	12.7	9,930,540	7.2
10,000- 25,000	1,023	9.2	15,797,932	11.5
25,000- 50,000	410	3.7	13,934,412	10.1
50,000-100,000	218	2.0	15,358,480	11.2
100,000-200,000	111	1.9	15,409,848	50.7
200,000-300,000	37		8,872,930	
300,000-400,000	23		7,618,947	
400,000-500,000	10		4,383,422	
500,000 and over	29		33,197,981	
Totals	11,142	100.0	137,374,259	100.0

Population in 1880, 1,783,085.

PROBATES IN MASSACHUSETTS: NUMBER AND AMOUNTS, AND THEIR PERCENTAGE DISTRIBUTION, 1889-91.†

	Number.	Per Cent.	Amount.	Per Cent.
Under \$500	2,217	15.2	546,605	.3
500- 1,000	1,738	12.0	1,269,863	.8
1,000- 5,000	6,197	42.4	15,073,011	9.7
5,000- 10,000	1,969	13.5	13,732,143	8.8
10,000- 25,000	1,498	10.2	23,142,749	14.9
25,000- 50,000	480	3.3	16,615,001	10.7
50,000-100,000	265	1.8	18,488,782	11.9
100,000-200,000	134	1.6	18,309,688	42.9
200,000-300,000	45		11,191,055	
300,000-400,000	22		7,462,719	
400,000-500,000	13		5,885,293	
500,000 and over	30		23,841,879	
Totals	14,608	100.0	155,558,788	100.0

Population in 1890, 2,238,947.

* The absolute numbers are from the Twenty-fifth Annual Report of the Bureau of Statistics of Labor, Massachusetts, 1894, p. 267.

† *Ibid.*, p. 267.

In these statistics there is exhibited a notable tendency to an increased number of the larger fortunes. There were two estates of over half a million probated in the earliest three-year period, and 30 such probated sixty years later. Meanwhile population had increased 267 per cent. The estates above \$100,000 were 11 in number in the earliest period, and 244 in the latest. The wealth of the community certainly did not increase at such a rate. The greatest growth of riches, but chiefly in numbers of moderate fortunes, appears to have occurred in the thirty years preceding the Civil War. In the latest decade covered there appears a tendency to reverse the process. For the latest period there is a decline in the *relative* number of half-million dollar estates probated. The tendency to concentration doubtless began to produce marked effects earlier in Massachusetts than elsewhere, owing to its leadership in manufactures and its lack of capacity for agricultural expansion. Hence the tendency may well have worked itself out by 1880.

But let us consider these figures in their proper relation to the growth of per capita wealth. According to the United States Census, the "true valuation" of real and personal property in Massachusetts for several decades past was as follows:—

PER CAPITA WEALTH IN MASSACHUSETTS.	
Year.	Amount
1850	\$577
1860	662
1870	1,463
1880	1,471
1890	1,252
1900	1,554

The per capita wealth of the State thus declined noticeably between 1880 and 1890. The two sets of figures, probate and census, are in general agreement as regards the indication that the relatively large number of estates of half a million or more in 1880 was in part but an expression of the greater per capita wealth of the State in that and in the immediately preceding years, as compared with ten years later and with twenty years

earlier. If a thorough relative test were applied, the year 1880 would probably not stand out so prominently in this matter of concentration of wealth as it does when one uses fixed class boundaries or any method which involves definition of the large fortune absolutely.

If the character of the actual statistics permitted the plotting of a practicable curve indicating relative quantities (that is, percentages), comparison of the course of such curves for different sets of data would immediately indicate to the eye which set was characterized by greater concentration.* The pyramid of fortunes, however, is of such a nature as not to lend itself readily to such diagramming. It is significant of prevailing inequality that the attempt to construct the curves fails because of the disproportion between the flattened base of the pyramid and the elongated peak. The curves resemble a capital L with enormously elongated arms and so little thickness of the different parts that the eye can form no judgment of quantitative relations. This is explained by the fact that the curve of the distribution of property is hyperbolic in its general characteristics.† Quantities arranged in something like a hyperbolic series do not lend themselves readily to ordinary graphic representation.

But a hyperbola is very easily represented graphically if one will plot the logarithms of the numbers instead of the numbers themselves. Just what the degree of difference is between two series of numbers so compared is not obvious, at any rate

* This is Mr. Lorenz's proposed method in the article referred to above. It is significant that Mr. Lorenz uses hypothetical figures, and thus fails to perceive the limited practical value of the particular species of graphic method that he prefers. The value of my comment in this discussion is subject to a similar qualification.

† If the statistics dealt with were not concentrated upon round numbers, the hyperbolic nature of the distribution of estates would find expression in the position of the arithmetic average of the estates within each class; that is, it should in each case be near the geometrical mean between the limits of the class. The Massachusetts statistics conform to this rule almost without exception. The British statistics almost as regularly do not conform to it; that is, the arithmetic average of the estates within the class is usually considerably above the arithmetic mean between the approximate boundaries of the class. The difference is explained by the fact that the estates at the round number which marks the lower limit of the class are included in it in the Massachusetts figures and the upper limit is exclusive; while in the British figures the lower limit is exclusive, and the upper limit inclusive, and especially the lower limit marks the transition to a higher tax rate.

to one who is not a trained mathematician; but the *direction* of the difference is unmistakable, and the method of testing for concentration is, so far as the writer can see, not open to criticism. This is what is needed.*

In the comparison of the logarithmic curves used in the following diagrams the crucial point is their *slant*. The steeper of two curves is the one which expresses the greater concentration. The scale used to represent the size of fortunes plotted must of course be identical for different sets of figures. The distance used to represent the logarithm of a given number of fortunes must also be the same for the different series compared. In order to assist the eye in comparing slants, however, it is often well to shift this latter scale along its own length, for one or more terms of the comparison, so as to bring the curves together at some convenient point. This is done in the following diagrams. Hence the logarithmic scale across the bottom of the diagrams indicates the actual logarithms plotted only in the case of the full line curves. In the other curves the scale corresponds to the series of logarithms plus a constant amount. The curves of the same diagram are thus made to start from the bottom at approximately the same

* As compared with the rearrangement of the statistics by the method of relative class boundaries, which also meets the requirement of defining large and small and middling fortunes relatively (that is, as so many times the mean fortune), the method of plotting logarithms has decided advantages. Of most practical importance is the fact that the amount of calculation involved in the use of the former method is prohibitive. The convincingness of the results, furthermore, is lessened by the necessity of using certain mathematical assumptions in rearranging the statistics. These assumptions are based upon principles not different from those used above, but are less satisfactory in application because more depends upon the accuracy of the fundamental averages. These averages are likely to be especially affected by inaccuracy in the reporting of small estates. Of the available averages the median is intrinsically to be preferred, since to measure the tendency towards large fortunes by a method which rests upon the arithmetic average is to weigh them in a balance the lengths of the arms of which are very largely determined by the large fortunes themselves. But the median would probably be most affected by the error resulting from the inclusion of a large number of debtor estates in the statistics.

More summary methods of testing for concentration may be in principle equally correct with those used in this article, but they do not deal directly or mainly with the point of most general interest; that is, the growth of great fortunes. For a summary test nothing could be better, it seems to me, provided satisfactory data are available, than the comparison of the median and the average, of course, by the use of the *ratio* of their difference to their sum or to one or the other quantity as a base, in order to preserve that relativity which is the essence of any correct measure of concentration.

point, each point of a shifted curve being moved horizontally the same distance.

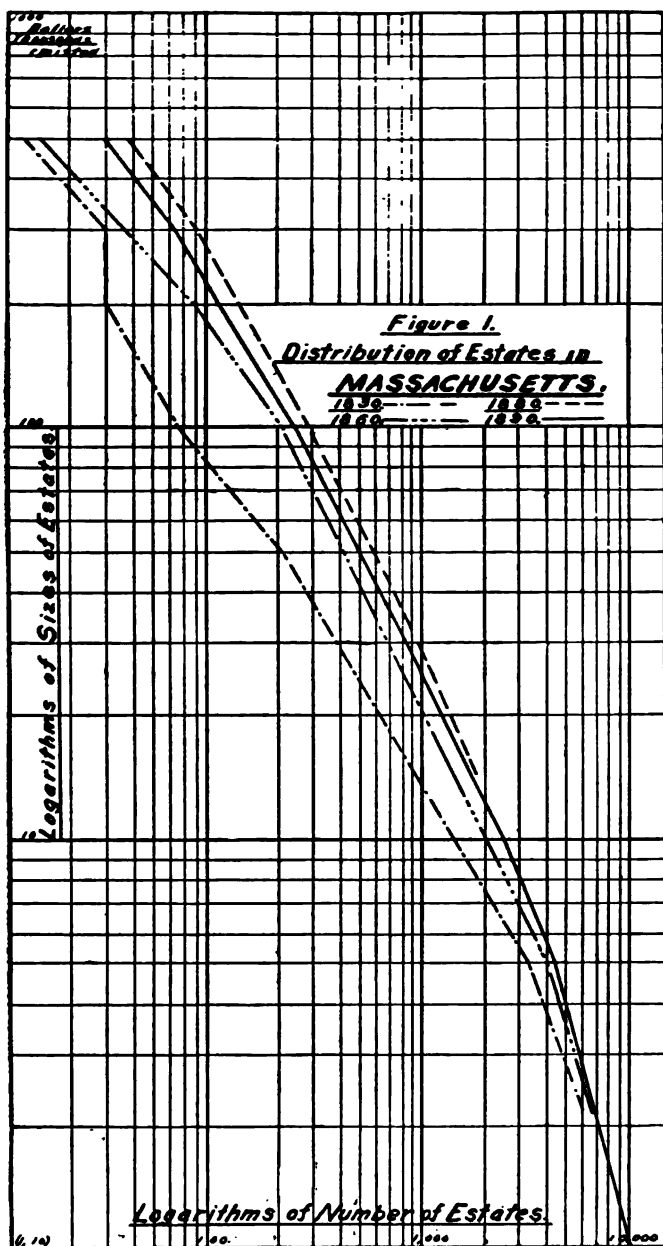
It is hardly necessary to add that, in judging these logarithmic curves by their comparative slant, the requirement of relativity in the test of concentration is fully and easily met.

The logarithms obtained for the above Massachusetts statistics, with the corresponding numbers, are as follows:—

Size of Estates, as large as	Log.	1830.		1860.		1880.		1890.	
		Number Estates.	Log.	Number Estates.	Log.	Number Estates.	Log.	Number Estates.	Log.
\$1,000 . . .	3.000	1,804	3.256	4,477	3.651	7,869	3.896	10,653	4.027
5,000 . . .	3.699	530	2.724	1,650	3.217	3,281	3.516	4,456	3.649
10,000 . . .	4.000	235	2.371	853	2.931	1,860	3.270	2,487	3.396
25,000 . . .	4.398	78	1.892	346	2.539	837	2.923	989	2.996
50,000 . . .	4.699	36	1.556	178	2.250	427	2.630	509	2.707
100,000 . . .	5.000	11	1.041	86	1.934	209	2.320	244	2.387
200,000 . . .	5.301	5	0.699	34	1.531	98	1.991	110	2.041
300,000 . . .	5.477	5	0.699	16	1.204	61	1.785	65	1.813
400,000 . . .	5.602	3	0.477	9	0.954	39	1.591	43	1.633
500,000 . . .	5.699	2	0.301	6	0.778	29	1.462	30	1.477

Plotting these data, we obtain the curves of Figure 1.*

* Where the lower part of another curve is not distinguishable from the curve for the statistics of latest date, it is discontinued. The numbers at the bottom of the diagram indicating the scale are those of the logarithms for the latest date. The measurement units are, of course, the same for the other sets of logarithms, but the scale is moved to the right a sufficient number of units to make the lower ends of all the curves coincide.



It is clear that there has been, in the period covered by these statistics, on the whole a pronounced tendency to concentration of wealth in Massachusetts. There was, however, a greater degree of concentration in 1880 than in 1890. The fact that the per capita wealth of Massachusetts in 1890 was less than in 1880 does not affect a test by the comparative slants of logarithmic curves. Neither does the omission of all reference to the propertyless affect in principle such a comparison. In the case of greater per capita wealth it is true one should be careful to allow determining points higher up on the curve to have their due influence on the judgment of slant.*

It is noticeable how closely these logarithmic curves approximate a straight line. A curve plotted thus by logarithms as a straight line is what is known to physicists and mathematicians as an adiabatic curve. The curve exhibits the relation between the pressure and the volume of a gas upon the assumption that it expands and contracts without either receiving or giving out heat. It is a general hyperbola.†

Probate reports do not furnish unimpeachable statistical material. But, as regards accuracy, it is only a constant ten-

* The writer has worked somewhat upon certain probate statistics of Maryland. Figures for Baltimore City, 1875 to 1890 inclusive, and 1888 to 1893 inclusive, and for the counties of Maryland, except Baltimore City, 1875 to 1879 inclusive, and 1890 to 1894 inclusive, are to be found in the Reports of the Bureau of Industrial Statistics of Maryland. They show a tendency to concentration for the State as a whole, though the statistics of Baltimore City by itself point slightly the other way.

† For the suggestion of the possibilities presented by the use of logarithmic curves for the purposes of this article, I am indebted to my colleague, Dr. F. R. Sharpe, of the Department of Mathematics, Cornell University. The same method is used by Pareto in his "*Cours d'Économie Politique*," vol. ii, p. 305, but for income curves. Pareto mentions the fact that the curve approximates a straight line. Mr. Lorenz's remarks about the logarithmic curve (pp. 216, 217) appear to be rather hasty. The "fixed classification" in the case of figures that are properly to be called statistics will have no effect on the steepness of the curve. It is true that the curve used above indicates nothing as to what may happen in the uppermost class; but can Mr. Lorenz's one multi-millionaire, however manipulated, form any basis for a statistical inference? The few cases at the very top must be treated separately if that appears necessary. Mr. Lorenz's suggested modification of the logarithmic method, which gives a place to the amount possessed by each class, has some advantages. Are they sufficient to outweigh added difficulties of visual interpretation? In any large body of reliable statistics, given the type of distribution as indicated, e.g., by the numbers in the classes, the amount of wealth owned by each class will bear a known relation to its numbers, except possibly in the case of the highest and lowest classes. The amounts would be determinable by accepted principles of interpolation.

dency to errors of the same sort that seriously affects inferences drawn where the significant numbers are relative. The constant errors, moreover, are such as to reduce the appearance of concentration. There is a tendency to overstate the value of small estates on account of not allowing for debts. For large estates there is a presumption of understatement, perhaps from habits acquired relative to statements made with reference to assessment for taxation. If this last is true, the weight of the large and largest fortunes is greater than appears. In the test, by the comparative slant of logarithmic curves the effect of the most important sources of constant error may be evaded by disregarding the portion of the curve that represents the number of small estates. Probated estates are also to a degree misrepresentative of contemporary fortunes, since they were made in the past and are in larger proportion estates of inactive investors. But this error is also constant or else to some degree unfavorable to the inferences drawn.* Of other objections to basing conclusions on probate statistics, it may likewise be said, in general, either that they are constant and do not affect the inference as to tendency or that they are different in their incidence on estates in such a way as to give the large estates less apparent than real gain.†

A pertinent objection to inferences as to the growth of riches is that the fewness of the largest fortunes implies a large "probable error" in the conclusion. But this objection is of more force against attempts to measure degree of concentration than against the determination merely of the fact that there is a tendency in that direction. And the establishment of this fact does not depend on this one point in the evidence.

It is perhaps worth while to test the comparative width of distribution; that is, the proportion of propertied to propertyless classes. This can be done for comparative purposes by

* Has the adult death-rate among classes having property declined much in Massachusetts from 1830 to 1890? Only so far as such a decline has affected different economic classes differently would it affect inferences relating to concentration.

† Cf. Mayo-Smith, "Statistics and Economics," p. 434, and Ely's comment, "Evolution of Industrial Society," pp. 266, 267.

getting ratios of probates to population. These are, probates per 10,000 of population, in Massachusetts:—

1830 (approximately)	20.2
1860 "	18.8
1880 "	20.8
1890 "	21.7

No attempt is made to calculate the percentage of property owners to total population. The ratio of probates to population we should expect to increase, owing to the growth of savings institutions. A declining birth-rate or any other cause (*e.g.*, immigration) that tends to increase the proportion of adults in the total population would produce the same appearance. This phase of the question, touching the proportion of property owners in the population, is also most affected by inaccuracy in probate statistics, hence the symptoms exhibited among the property owners are more significant. Perhaps the most that can be inferred from the ratios just given is that there has been no important change in the relative number of probates such that it would give ground for a suspicion that the figures for different decades are not comparable.

The tendency to concentration, or to an increase in large fortunes, is a result of general causes operating throughout the western world. Evidence from other countries is important as supporting the conclusion from the statistics directly relating to the United States.

Probate statistics for Great Britain and Ireland follow:—

**AMOUNT OF PERSONAL PROPERTY IN ESTATES SUBJECT TO PROBATE AND ADMINISTRATION
DUTIES IN THE UNITED KINGDOM, 1838.***

Size of (Personal) Estate.	Number.	Amount.
Under £1,000 †	18,316	£5,546,555
£1,000 to 10,000	6,006	18,275,560
10,000 to 25,000	685	10,427,750
25,000 to 50,000	216	7,050,000
50,000 to 75,000	53	3,095,000
75,000 to 100,000	30	2,580,000
100,000 to 500,000	35	5,712,500
500,000 to 1,000,000	2	1,200,000
1,000,000 and upwards	1	1,000,000
Totals	25,344	£54,887,305

Population of United Kingdom in 1838 (estimated), 25,905,194.

**NUMBER AND NET CAPITAL VALUE OF ESTATES ASSESSED TO PROBATE DUTY IN THE UNITED
KINGDOM, CLASSIFIED BY SIZE, DURING THE 5-YEAR PERIOD 1884-85 TO 1888-89
(EXCLUSIVE OF PROPERTY ASSESSED TO CORPORATION DUTY).‡**

Class.	Number.	Amount.
Of £1,000 and under £4,000 §	41,326	£86,069
" 4,000 " " 10,000	14,441	92,473
" 10,000 " " 50,000	10,145	214,303
" 50,000 " " 100,000	1,251	87,581
" 100,000 " " 500,000	737	138,959
" 500,000 " " 1,000,000	43	28,085
" 1,000,000 and upwards	12	20,811
Totals	67,955	668,281

Population in 1887 (estimated), 36,593,692.

* Data from Porter, "Progress of the Nation," 1843, vol. iii, pp. 131-133. There are errors in certain of his totals which are corrected in the above.

† The lowest class taxed is £20 to £100.

‡ United Kingdom Statistical Abstract, 41st number, p. 35.

§ Estates below £1,000 include estates below £300 at gross value, hence this class is omitted.

NUMBER AND NET CAPITAL VALUE OF ESTATES OR PORTIONS OF ESTATES LIABLE TO ESTATE DUTY IN THE UNITED KINGDOM, CLASSIFIED BY SIZE, FOR THE 5-YEAR PERIOD 1901-02 TO 1905-06.*

Class.			Number.	Amount.
Exceeding	£100 but not exceeding	£500	28,551	£13,069
"	500	" 1,000	49,136	41,131
"	1,000	" 10,000	81,140	298,441
"	10,000	" 25,000	11,231	203,973
"	25,000	" 50,000	4,500	175,188
"	50,000	" 75,000	1,403	95,852
"	75,000	" 100,000	699	65,026
"	100,000	" 150,000	649	85,812
"	150,000	" 250,000	427	92,089
"	250,000	" 500,000	246	93,075
"	500,000	" 1,000,000	99	77,437
"	1,000,000	"	28	84,608
Totals			178,099	£1,325,701

Population in 1904 was 42,793,272.†

The numbers for which logarithms are wanted, with their logarithms, follow:—

Size of Estates, as large as	Log.	1838.	
		Number Estates.	Log.
£1,000	3.000	7,028	3.847
10,000	4.000	1,022	3.009
25,000	4.398	337	2.528
50,000	4.699	121	2.083
75,000	4.875	68	1.833
100,000	5.000	38	1.580
500,000	5.699	3	0.477
1,000,000	6.000	1	0.000

* United Kingdom Statistical Abstract, 53d number, p. 45.

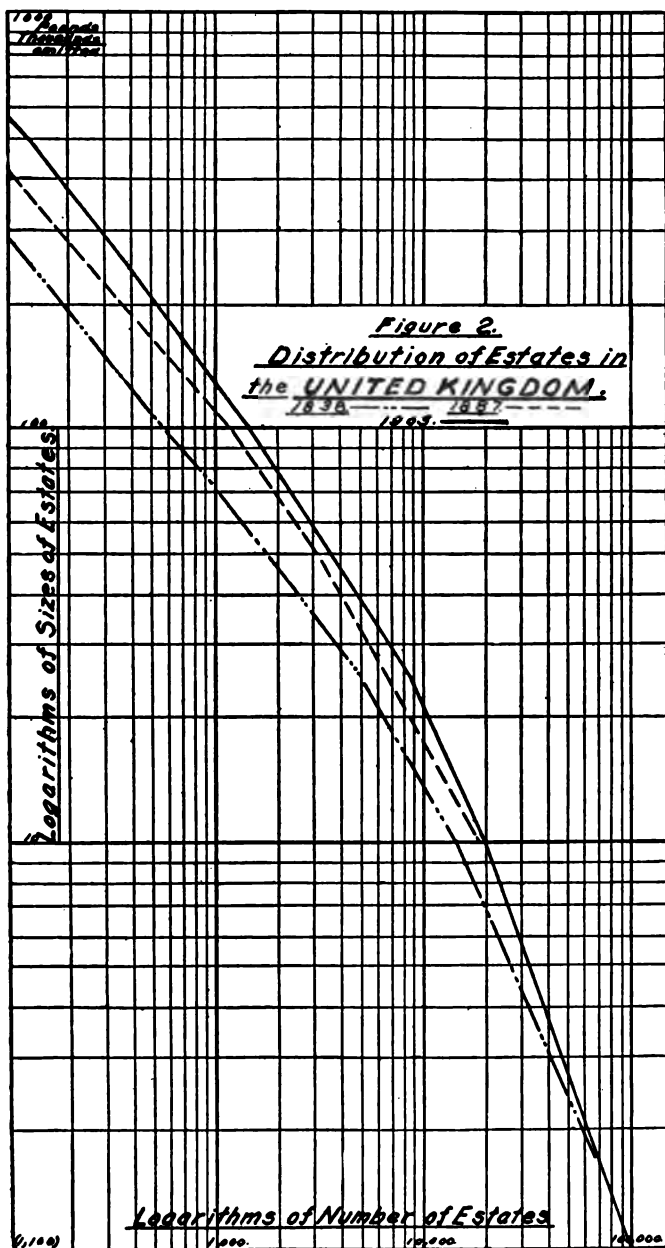
† *Ibid.*, p. 347.

Size of Estates, as large as	Log.	1884-85 to 1888-89.	
		Number Estates.	Log.
£1,000	3.000	67,355	4.832
4,000	3.602	26,629	4.425
10,000	4.000	12,188	4.086
50,000	4.699	2,043	3.310
100,000	5.000	792	2.899
500,000	5.699	55	1.740
1,000,000	6.000	12	1.079

Size of Estates, as large as	Log.	1901-02 to 1905-06.	
		Number Estates.	Log.
£100	2.000	178,099	5.251
500	2.699	149,548	5.175
1,000	3.000	100,412	5.002
10,000	4.000	19,272	4.285
25,000	4.398	8,051	3.906
50,000	4.699	3,551	3.550
75,000	4.875	2,148	3.332
100,000	5.000	1,449	3.161
150,000	5.176	800	2.903
250,000	5.398	373	2.572
500,000	5.699	127	2.104
1,000,000	6.000	28	1.447

Plotting these logarithmic quantities as curves, we obtain the results exhibited in Figure 2.*

* See foot-note to Figure 1.



These figures are not exactly comparable for the successive periods covered. Those for 1838 relate only to personalty. The same is true of the figures for 1884-85 to 1888-89,* which are therefore comparable with those of 1838. Changes in the law in 1889, followed by simplification and systematization in 1894, extended the taxation so that realty is included in the figures of later date.† As indicated in the tables above, there is a difference between the figures for the earlier periods and for the latest period used as regards the method of classification; that is, estates at the lower boundary of the class are included and those at the upper limit not in the former case, while the lower boundary of the class is exclusive and the upper inclusive in the latest figures. This does not affect the validity of the results of testing for concentration by the slant of logarithmic curves. In practice, it is true, the tendency to concentrate estimates on round numbers might make a slight difference in the reliability of the indication from a comparison of figures employing classifications differing in this respect.

The figures for the latest period include all realty, and are in every way the most reliable and complete. The ownership of realty in England is, for historical reasons, notoriously concentrated, and the appearance of greatest concentration at the latest date might be due only to the previous inadequacy of the picture. But such an argument leaves little room for much decentralization in the ownership of real estate. And comparison of the figures for the two earlier periods shows—even after making allowance for evident irregularity and inaccuracy of the figures for 1838—an unmistakable tendency to concentration in the ownership of personalty, which has probably not been

* Exactly what effect the qualification "exclusive of property assessed to corporation duty" would have, I am unable to say; but Giffen uses figures resulting from the identical tax laws as comparable with Porter's figures. See *Journal of the Statistical Society*, 1883, p. 614. The amount so exempted is inconsiderable.

† Bastable, "Finance," 556, ff. Spahr ("Distribution of Wealth," p. 16, ff.) is therefore mistaken in his assumption that the figures of 1892 are exclusively for personalty. Of the three sets of figures used, those for the latest period and for the intermediate period are net. Of the figures for 1838 Porter says (iii, p. 128), "The amounts are in many cases reduced by the payment of debts due from the deceased and by other charges upon their estates." Does this mean that the figures are not net?

completely reversed in the latest period. In the United States the evidence is clear for a much greater degree of concentration in the ownership of personalty than of realty, and there is likely to be no absolute inconsistency as regards economic conditions in New York and in Great Britain. The tendency of personalty, too, is the tendency of three-fourths of the wealth of Great Britain.* The conclusion that there has been, on the whole, in the last half-century, a tendency to concentration in the ownership of wealth in the United Kingdom appears to be not presumptuous.†

An important question to be considered, however, before drawing any conclusion from the above figures is, What is the relation between the character of the distribution exhibited by a combination of two sets of figures and the character of the distribution of the original series thus added together? The addition in the present case is effected through the possessors of the two kinds of property being the same persons; that is, the people of the United Kingdom. If the distribution were in each case a mere chance distribution, and if there were thus no correlation between the causes of inequality in the two cases, the effect of summation would obviously be a levelling down of previously existing inequalities. Both of these suppositions, however, are contrary to fact in the case of the statistics before us. The inequalities are not the result of chance distribution, and the same set of forces which produces inequality in the ownership of the one kind of property produces the inequality in the other case. There is thus a positive correlation of the inequalities. Certainly, no negative correlation is to be expected, such as would make the inequalities cancel each other, implying that those who possess little personalty possess much realty and *vice versa*.

Suppose, then, that there is correlation between the in-

* These facts are dealt with by the writer in a study of the economic causes of the growth of great fortunes recently published by the American Economic Association. See "The Growth of Large Fortunes," p. 49.

† Porter, in 1851 (*Journal of the Statistical Society*, p. 198), compiled figures which appear to show conclusively that there was no tendency to concentration in the ownership of personalty between 1833 and 1848.

equalities and that it is positive in its nature. Suppose, also, that the inequalities are about the same in each case, that is, that the shares in each case are corresponding proportions of the total amount distributed. Then, according to the mathematics applicable to this situation, if the positive correlation is perfect and if the inequalities are the same, the inequality resulting from summation will also be the same as the original inequalities. But, if the correlation be not quite perfect, the result of summation must be lessened inequality. If the inequality be greater in one case than in the other, and if the correlation be perfect, then the resulting inequality will be intermediate. But, *if the correlation of the original inequalities is imperfect, the resulting inequality is likely to be less than either of these original inequalities*, even though they differ considerably. This last is the case of the statistics of the United Kingdom with which we are dealing.

Though it is open to question, it may be that there is a greater inequality in the distribution of landed property in the figures for the United Kingdom than of personalty. Even so, summation of the two kinds of property would probably not produce an appearance of greater inequality than that exhibited in the distribution of the personalty by itself. The greater weight of personalty in the total of the wealth involved supports the inference that a possible greater concentration in the ownership of realty is probably not responsible for the difference between the latest figures and the others. It is highly probable, therefore, that the greater concentration at the later date is due to an actual tendency in that direction rather than to a difference in the inclusiveness of the statistics. If the appearance were the other way, the validity of an inference would be much more open to question.*

Recently counteracting factors may have been working to produce less concentration. The most recent American figures

* The period since the adoption of the present tax laws is so short that no good test of tendency on this basis is possible. The figures for the four years immediately preceding those for the latest period used, these two sets being exactly comparable, give a slant to a logarithmic curve practically indistinguishable from the latest plotted. But there were in proportion a few less estates over £1,000,000 in the later than in the earlier period.

used are, as we have seen, somewhat ambiguous. Exemptions under Schedule A of the British income tax, moreover, point to a decided gain in the ownership of income-producing property by persons with small incomes.*

On the face of the figures it appears that there is greater concentration in Great Britain than in Massachusetts, since the slant of the curves drawn to the same scales is slightly greater in the former case than in the latter. Any positive conclusion from such a comparison, however, is defeated by the different nature of the statistics used, the British figures being tax statistics and net, the Massachusetts figures being mere probate statistics, influenced by no motive to check underestimation of large estates or overestimation of small debtor estates. Since the direction of the errors is of a kind to invalidate the natural inference, no positive inference can be drawn.

For France neither estates nor incomes appear to have been classified in official publications, with reference to size, long enough to make them available to test the operation of a tendency to concentration. Succession statistics are of long standing, but have only recently been classified by size. The figures for 1903 and 1904 subjoined indicate considerably less present concentration of riches in France than in the United Kingdom or than in the older and industrialized portions of the United States.† This is the general opinion as regards the sources and the distribution of French accumulations.

* This point is developed by the writer in the study above mentioned at p. 137.

† The difference is great enough to warrant an inference, even though the statistics are not exactly comparable, especially as the differences are such as tend to conceal the difference, the British figures including *inter vivos* gifts and the American figures being not net.

CLASSIFICATION OF SUCCESSIONS ACCORDING TO NET VALUE, 1903 AND 1904.*

	Number.	Per Cent.	Amount (000's omitted).	Per Cent.
From 1 to 500 francs . . .	241,097	31.5	63,380	.6
" 501 " 2,000 . . .	208,382	27.1	265,589	2.6
" 2,001 " 10,000 . . .	205,957	26.8	1,005,423	9.8
" 10,001 " 50,000 . . .	83,889	10.9	1,791,340	17.6
" 50,001 " 100,000 . . .	13,955	1.8	975,604	9.6
" 100,001 " 250,000 . . .	8,872	1.2	1,886,095	18.6
" 250,001 " 500,000 . . .	3,073	.4	1,078,960	10.6
" 500,001 " 1,000,000 . . .	1,430	.2	990,691	9.7
" 1,000,000 " 2,000,000 . . .	664	.1	944,248	25.9
" 2,000,000 " 5 mil. . . .	242		712,739	
" 5 " 10	50		368,277	
" 10 " 50	18		319,315	
Upwards of 50	4		301,092	
Totals.	767,633	100	10,197,753	100

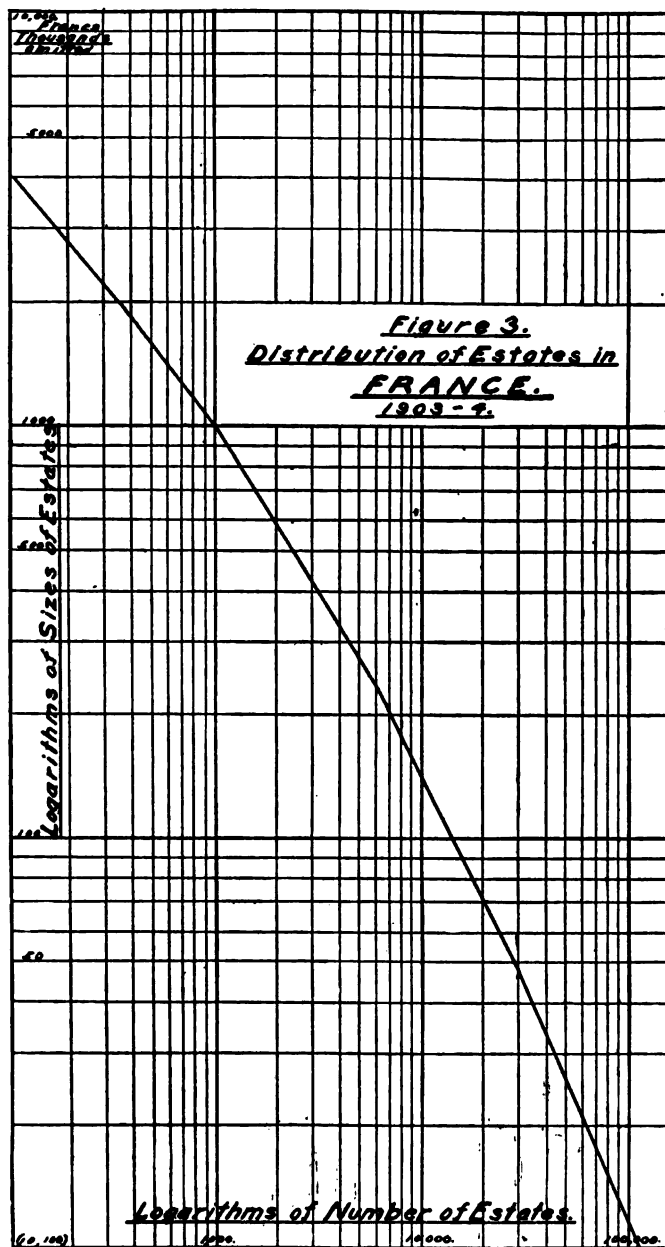
Population about 39,000,000.

The data for a logarithmic curve follow:—

Size of Estates, as large as	Log.	Number Estates.	Log.
501	2.700	526,536	5.721
2,001	3.301	318,154	5.503
10,001	4.000	112,197	5.050
50,001	4.699	28,308	4.452
100,001	5.000	14,353	4.157
250,001	5.398	5,481	3.739
500,001	5.699	2,408	3.382
1,000,000	6.000	978	2.990
2,000,000	6.301	314	2.497
5,000,000	6.699	72	1.857
10,000,000	7.000	22	1.342
50,000,000	7.699	4	0.602

These values are plotted in Figure 3.

* *Annuaire Statistique*, 1903, p. 285, and 1904, p. 231. In these two years the value of donations and successions together was 12,190.2 mil. francs, so the above statistics relate to five-sixths of the wealth of the country. See *Annuaire* for 1905, p. 78. The British figures include *inter vivos* gifts, I suppose as "portions of estates." They amount to much less than in France, as we should expect, on account of dotation and similar customs prevalent in the latter country.



Yet, if we may accept the conclusions of the French authority D'Avenel, there has been a pronounced tendency to concentration in France in the last century. His summary statement is, "The richest men of to-day are 6 times as rich or, comparing those of equal fortune, 12 times as numerous, as the richest personages of the old régime; they are 10 times as rich or 20 times as numerous as the richest princes of feudal times."* After making much allowance for the unrelativity of this proportion, the statement may be accepted as indicating tendency towards concentration.

The same authority estimates the number of persons in France with an income of 200,000 francs at 1,000.† There appear to be as many as 4,000 millionaires in the United States.‡ It appears, therefore, that we have, roughly, twice as many millionaires in proportion to population as France, though our per capita wealth is about the same.

For Germany it is necessary to test concentration and its tendency by other material than statistics of inheritances. The best available material is income statistics.

Income statistics show something besides concentration of wealth. But they may show that among other things. For the largest incomes may be considered to be due almost wholly to income from property. These large incomes from property are only the cap of a change which probably affects the pyramid of incomes from top to bottom in the direction of concentration. The growth of the salaried class, known from other evidence,§

* *Revue des Deux Mondes*, February, 1906, p. 861.

† *Ibid.*, p. 866.

‡ The New York *Tribune's* List of American Millionaires (1892) gives a few more than this. Though not of a nature to be quantitatively reliable, the estimate has been considerably used for want of something better. The Massachusetts probate figures indicate a corresponding number of millionaires, so the number 4,000 may be considered a fair though rough approximation, and rather an understatement for the present date.

§ A study of occupation statistics and other data throwing light on the growth of the salaried class is only indirectly important for the purposes of this article. Concentration of wealth and concentration of incomes are different matters. But, if the class of middling incomes is being reinforced by the growth of the salaried class, and if, nevertheless, that class is no more than, or barely more than, holding its own, as compared

accounts for the increased number of middling incomes. These cannot, therefore, be balanced against the increase of very large incomes. On the contrary, they seem rather to be taking the place of moderate propertied incomes. But, if the growth of very large incomes is enough to outweigh the growth of the

with the increase of large fortunes, this is a strong indication of concentration of property and of income from property.

There has been of late, in fact, a very noteworthy increase in the salaried class relative not only to the number of entrepreneurs, but also to the number of "wage-earners." For the tendency in manufactures we need only to cite the figures of the latest United States Census of Manufactures, that for 1905. In the five-year period 1900 to 1905 salaried officials, clerks, etc., increased in number 42.7%, while the number of wage-earners increased but 16.0%. In the German statistics of occupations the class of *Angestellte* corresponds to our "salaried officials, clerks, etc." The number of these at the dates given was as follows (the data are as given by Zahn, Conrad's Handwörterbuch, ii, p. 804):—

	1882.	1895.	Absolute Increase.	Per Cent. Increase.
Landwirtschaft . . .	66,644	96,173	29,529	44
Industrie	99,076	263,745	164,669	166
Handel	141,548	261,907	120,359	85
Ueberhaupt . . .	307,268	621,825	314,557	102

The increase in the total number of persons occupied was 17.80 per cent. Entrepreneurs employing assistants increased, in the period from 1882 to 1895, 1.3 per cent.; laborers, 62.6 per cent.; officials, 118.9 per cent. (Schmoller, "Grundriss," p. 436.) The salaried class is clearly gaining ground, though the propertied middle class is losing. The connection of both of these tendencies with modern industrial developments is obvious.

These statistics suggest a line of thought and investigation, which, however, does not promise readily to lead to a positive issue. If the question be asked, how far the growth of the "great industry" directly and positively favors the increase of the middle class—as some seem to think it does—the difficulties in the way of arriving at a convincing conclusion are many. It would be necessary to know how the salaried class compares with the small-propertied class as regards economic condition, in particular how the different kinds of income, one kind being partly an income from goods, are to be weighted for comparison. Assuming that the two are to be accepted as equivalent middle classes, it would then be necessary to show that the salaried class was, as compared with the proportion of the small-propertied entrepreneurs to the total of those occupied in small-scale manufacturing, either a larger and not decreasing proportion of the total occupied in large-scale production or that it was as large a proportion and gaining ground. And, if the two members of the comparison are not constant in character, changes in their composition and income must be taken into account. The number of variables is not small.

The growth of the salaried class may yet be the means to the reinvigoration of a small or middle propertied class, owners, this time, of abstract property, that is, of bonds and other "securities." In power of saving, moderate incomes appear to have the advantage as regards subjective factors. On the objective side, too, in the field of investment, the evolution of abstract property appears to be putting the possessors of such income on the same plane with the possessors of large fortunes.

salaries class, the evidence of concentration is clear and strong. Recently Adolf Wagner has worked over the later and very reliable Prussian income statistics, with results given in the following table:—

Size of Income (Marks).	Prussia: Per Cent. Distribution of Incomes.*					
	1892.		1896.		1902.	
	Numbers.	Amounts.	Numbers.	Amounts.	Numbers.	Amounts.
Up to 900 . . . (tax free)	78.18	41.21	76.88	40.03	70.66	32.97
900 to 3,000 . .	18.98	30.01	20.23	31.50	25.83	34.92
3,000 to 30,500 .	2.74	20.20	2.79	19.99	3.38	21.57
Over 30,500 . .	0.10	8.58	0.10	8.47	0.12	10.54

	Incomes in Prussia in †							
	1892.				1902.			
	Numbers.		Amounts.		Numbers.		Amounts.	
	Absolute.	Per Cent.	Mil. M.	Per Cent.	Absolute.	Per Cent.	Mil. M.	Per Cent.
900— 3,000	2,118,969	86.99	2,912	51.05	3,309,696	88.04	4,460	52.10
3,000— 6,000	204,544	8.40	832	14.59	291,341	7.75	1,179	13.77
6,000— 9,500	55,561	2.28	413	7.24	77,636	2.07	575	6.72
9,500— 30,500	46,092	1.89	715	12.54	64,737	1.72	1,001	11.69
30,500— 100,000	9,034	0.37	451	7.91	13,205	0.35	655	7.65
100,000— 500,000	1,555	0.06	277	4.86	2,594	0.07	485	5.67
500,000—1,000,000	72	0.003	47	0.82	108	0.003	72	0.84
1,000,000—2,000,000	27	0.001	37	0.65	44	0.001	64	0.75
Over 2,000,000	4	0.0002	20	0.35	16	0.0004	69	0.81
Total of above	2,435,858		5,704		3,759,377		8,560	
Tax free . . .	8,726,215		3,998		9,053,608		4,211	
Grand total . .	11,162,073		9,702		12,812,985		12,771	

* *Zeitsch. des Preuss. Statist. Bur.*, 1904, p. 255.

† *Ibid.*, p. 263. Like figures are given in the *Bul. Inst. Internat. de Statist.*, vol. xiv, Part III. Certain insignificant inconsistencies in the ratios above are in the original tables.

The gain of the class immediately above 900 marks in the ten years covered by the above statistics is very notable. The limit thus set for taxation is so low as to include not merely the salaried, but also some of the wage-labor class, which is also considerably increasing its income. Relative to all taxed incomes those of the middle classes are losing ground, despite the rapid increase of the salaried class. These statements are in terms of absolute income classes. But the average income is slightly lower at the later than at the earlier date, which makes a relative test not indispensable.* A comparison of the logarithms of the quantities involved of course rather strengthens the conclusion.†

The incomes taxed are unhomogeneous in character. It is impossible to separate incomes from labor from those from property, so as properly to weight the latter. The most exacting attention to the requirements of method cannot make up for these defects in the material. We can only refer to the known tendency towards an increase of the salaried classes, marked in Germany as elsewhere, and also, for these statistics, to the tendency towards higher money wages, as strengthening

* The facts that the average of incomes included is somewhat lower at the later than at the earlier date, and that the number included is a larger proportion of the population, suggest an increase of administrative efficiency. Which way this would affect the indications of the statistics as regards concentration, and how much, is a question. It looks as if there is no neglect of the smaller incomes. If increased adequacy is greatest here, the inference as to concentration is strengthened.

† Logarithms of numbers in income classes of 900 marks and above are:—

Size of Income as Large as	1892.		1902.	
	Numbers.	Log.	Numbers.	Log.
900 marks	2,435,858	6.387	3,759,377	6.575
3,000 "	316,889	5.501	449,681	5.653
6,000 "	112,345	5.050	158,340	5.200
9,500 "	56,784	4.754	80,704	4.907
30,500 "	10,692	4.029	15,967	4.203
100,000 "	1,858	3.269	2,762	3.441
1,000,000 "	103	2.013	168	2.225
2,000,000 "	31	1.491	60	1.778
	4	1.602	16	1.204

It is hardly necessary to plot these results.

the inference from the greater increase of the large incomes that there is concentration of *wealth*. It is these large incomes that are incomes from property. The actual fortunes are of course, if the interest rate is falling, increasing at a faster rate.

We should expect to find a reflection of the effects of the rapid industrialization of Germany in just these contemporary Prussian income statistics. The Berlin and Rhineland districts show the most pronounced tendency to concentration.* As regards the symptoms observable in other countries, pointing to a tendency toward a rehabilitation of the small-property class, such a tendency could hardly affect these statistics noticeably, and is perhaps less to be expected to show itself in Germany as yet on account of that country's being in an earlier stage of the abstract-property development.†

Only the most satisfactory bases of comparison and tests for the growth of fortunes have been used in the foregoing. Aside from lack of space, other methods, for example based upon statistics resulting from general property and house taxes and the like, are less accurate, as the data are even more impeachable than the above.

One point of general evidence, not of a statistical nature, may be added. Prices paid for curios and articles of luxury by the rich have enormously increased in the last two generations. Fine pictures and fine furniture, fine building sites and fine houses, have, wherever scarcity checks production and stimulates ambition, been bid up to astonishingly high prices. The buying of paintings of "old masters" and others by American

* See the article cited, *Bul. Inst. Internat.*

† British income statistics for Schedule D (that is, "profits from businesses, concerns, professions, employments," etc., classified by size) are often used as evidence of decreasing concentration of wealth (especially by Giffen and Goschen and by others following them). They show gains for middling incomes of the professional and salaried class, independent entrepreneurs, and the like. But they are not highly satisfactory material, since they are fractions of incomes, not the whole incomes of the persons entered (Report of Commissioners of Inland Revenue for 1902-03, p. 207), since they are also from the most unreliable of the schedules for accuracy (*Ibid.*, p. 173), and since they are affected by transfer into other classes (*Jour. Roy. Stat. Soc.*, 1888, p. 640). They are quite unsuited for our purposes, moreover, because the major portion of income from property, and especially abstract-property income, is entered under the other schedules.

millionaires in the last few years, at prices which competing European millionaires and princes could not afford to pay, is highly significant both of gratifying improvement in the ambitions of some of our multi-millionaires and of the fact that we possess the multi-millionaires.

The conclusion of this examination of the evidence relating to concentration of riches is: there has been, on the whole, in the last half-century or so, a tendency to concentration in the leading countries of the Occidental world. There appears to be more difference of opinion on this question than the evidence justifies, because the question of concentration of wealth is confused with that of concentration in the distribution of incomes. The poor are not getting poorer in the sense of receiving smaller incomes. Wages have demonstrably risen in the last half-century. But the concentration of wealth is a different question. Even in property the poor have, on the whole, probably gained absolutely. The question whether there has been enough rise in wages and salaries and enough absolute gain in property, both combined, to compensate or more than compensate for the relatively greater gains in property by the rich is irrelevant to our present purpose.

The situation, even when strictly confined to the question of concentration of wealth, is not without its encouraging features. The tendency is not so decisive, not even so unequivocal, as some would claim. Lately the small-propertied class may have been gaining in weight, relatively as well as absolutely. Their saving power is such, and most recently their opportunities of investment have so improved, that their set-back is perhaps only temporary. In manufactures and the like, where the critical field is, industrial organization is adapting itself to subdivided ownership.

That there has been a general tendency to a disproportionate growth of large fortunes in the last half-century is clearly established. This we should expect as the primary though not necessarily the ultimate effect of the modern régime in industry.

THE MEASUREMENT OF SOCIAL PRESSURE.

BY FRANKLIN H. GIDDINGS.

Any massing of living organisms into local aggregates interferes in a degree with the freedom of action of each individual organism. The aggregation of human beings in communities occasions a relatively high degree of interference, because merely physical obstruction is supplemented by the restrictions of liberty that are imposed by psychological evolution. The thought and the will of each affects the conduct of all: the concerted will of many often restrains or coerces the behavior of any one or of a few.

Let us call the restraining or compelling power which the social aggregate imposes upon its units a social pressure. Is it possible to investigate social pressure by quantitative methods? Can we measure it? The purpose of this brief paper is to describe a method of obtaining index numbers of social pressure. I have been led to believe that it is quite as possible to determine relative intensities and changes of social pressure in different nations, commonwealths, or minor communities, as it is by the same general method to determine changes in the purchasing power of gold from time to time or from place to place.

In modern communities the social will finds definite expression in legislation, and social pressure is therefore most extensively and precisely exerted through the forms of law. Of these forms the statutes enacted by legislatures are relatively explicit, they admit of classification, and they can be counted. Penalties for non-observance also admit of numerical statement. With relatively few exceptions, they are fines, ranging from one dollar up, or terms of imprisonment for stated periods.

As expressions of social pressure, statutes fall naturally into the following classification. Some prohibit or deny, as, for example, an enactment forbidding a specified form of gambling

or forbidding the sale of intoxicating drinks. Some restrict, by establishing a State monopoly or otherwise, as, for example, the federal statutes creating a postal system. Some regulate, as, for example, statutes governing banking, insurance, or railway transportation. Under the first of these categories we may conveniently make as many as five subdivisions according to penalty. Under each of the other categories we may make the subdivisions "generally," and "local only." Adding to our categories the class "Unrestricted,"—that is to say, all acts or kinds of behavior that the State does not prohibit, restrict, or regulate, save in that minor degree which is described as "keeping the peace,"—we have a gradation from "Prohibited" down to "Unrestricted" of ten degrees, which may be designated by the numerals from ten down to one. In like manner the law may make certain acts or relations compulsory; it may create an agent or commission as an organ of government with power; or it may merely maintain or aid an enterprise at public cost. All remaining acts and relations may be classed as "Voluntary." The category "Compulsory" may be subdivided into five grades according to penalty, and the category "Established as an Organ of Government" may be subdivided into the grades "with maximum," "with medium," and "with minimum power." We may thus again get ten degrees of social pressure, which may be designated by numerals from ten down to one.

Using these gradation categories as column headings, we may then, as in the accompanying form, construct a table of legal provisions in force in any commonwealth, so as to show their significance as manifestations of social pressure.

It will be observed that the number entered against any item is the number that stands at the head of the column to which as a fact of classification the provision in question is properly assigned. The investigator, therefore, does not mark according to any subjective standard. The values are assigned in advance. He has only to be careful to avoid errors of classification, and his decisions can be checked by other investigators or by his readers, his data always being accessible.

SOCIAL PRESSURE: ILLUSTRATIVE TABULAR FORM.

	Prohibited or Denied, with Penalty.						Restricted, (by State Monopoly or otherwise) or Regulated.						Compulsory with Penalty.				Established, Maintained, or Encouraged.			
	Death or life imprisonment.						Restricted, generally.						Death or life imprisonment.				As organ of government, with maximum powers.			
	Prison, 1 year or more.						Restricted, locally only.						Prison 1 year or more.				As organ of government, with medium powers.			
	Prison or \$500 or more.						Regulated, generally.						Prison or \$500 or more.				As organ of government, with minimum powers.			
	Prison or \$100 or more.						Regulated, locally only.						Prison or \$100 or more.				Maintained or encouraged at public cost.			
	Prison or less than \$100.						Unrestricted.						Prison or less than \$100.				Voluntary.			
Commonwealth X.	10	9	8	7	6	5	4	3	2	1	10	9	8	7	6	5	4	3	2	1
Social population:																				
Migration: foreign . . .	-	-	-	-	-	5	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Migration: Inter-state . .	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Migration: Intra-state,	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Social mind:																				
Communication	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Meeting	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Discussion	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Publication	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Social organisation:																				
Bigamy	-	-	8	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-
License to marry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trade union	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Railroad commission . .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
Social welfare:																				
State University	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Old age pensions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Totals	8	+	5	+	2+5	+	6	+	4	+	4+1	=	35							
Index number																				2,692

Footing the columns, obtaining the grand total, and dividing by the whole number of items marked, an arithmetical average is obtained which is similar in form to index numbers in general. May it be accepted as in fact an index number of social pressure for the Commonwealth described?

The most obvious objection is that the enactment of a law does not necessarily mean enforcement. If we had comprehensive and accurate statistics of prosecutions and convictions and of orders of injunction and mandamus, it would of course be desirable to subdivide our categories further, so as to show gradations of enforcement. Statistics of this kind, however, are notoriously defective, and an attempt to mark degrees of enforcement would introduce the uncertainties of subjective estimate.

I am satisfied that the objection itself is not a serious one. The community has other ways of enforcing its will which supplement the legal process. There is an immense amount of coercion which is exercised through public opinion, social favor or disfavor, and the conceding or withholding of business opportunity; and observation will, I think, confirm the judgment that, when the community or some interest in the community feels strongly enough upon any given subject to express its will in statute law, it can and does in a large measure enforce its decree in extra-legal ways, even when the statute itself is enforced but imperfectly. I conclude, then, that the actual enacting of a statute by a legislative body is, in practically every case, an index of actually existing social pressure.

It should be explained, perhaps, that this is true even when the pressure originates with a minority or even with a few individuals, since even then it is an actually disturbing influence affecting in some measure the liberty of all other individuals upon whom it impinges.

The simplest way to obtain such an index number as has been described would be to count up from the statute books all the acts of any category, for example, the category "Prohibited," and falling within a given range as to penalty, multiply this number by the grade number at the head of

the column, enter the product in the column, and so proceed with each subdivision of each category, that is to say, with each column. This method would have, however, the very serious objection that the investigator's procedure could not be followed and checked by his readers, and mistakes of classification and of counting could therefore pass undetected.

The method of full detail (that is, of entering at the left-hand margin of the table every item of legislative enactment) is open to the quite different objections that it is exceedingly cumbersome, and that it leaves much to be desired in respect of possible groupings of similar things, whereby the incidence of social pressure upon various phases of individual or of collective action might advantageously be exhibited.

I prefer, therefore, a scheme according to which a rather full list of items, grouped according to certain sociological categories, is presented in the left-hand margin of the table. Supplementing this list should be the items "All Other Prohibitions," "All Other Restrictions," "All Other Regulations," etc. The number corresponding to each of these items (*e.g.*, the number of "All Other Prohibitions" as counted) should be multiplied by the grade number at the top of the proper column, —penalties having been averaged,—and the product should be entered in the column.

The objection may be made to this last procedure, as it might be made to the method of complete detail, that in comparing one commonwealth with another we sometimes find that in one commonwealth prohibitions are itemized which in another commonwealth are brought under one general prohibition. We, therefore, might have three or four entries of any given number in one table, and in another table only one entry, the facts being substantially the same in the two cases, except in respect of one point, statutory detail. I am disposed to think that this complication does not vitiate the procedure, because I believe that the specific itemizing of legal commands is itself usually an index of social pressure; that is to say, it is usually a higher degree of social pressure which makes detailed or specific prohibitions or demands, instead of general ones.

There is one final and important reason for making any such table rather detailed. Having a large number of numerical entries in the columns, we may advantageously obtain all deviations, item by item, from the mode and from our final average or index number, and get the standard deviations. These, showing the degree of closeness of clustering about the average and the mode, are index numbers of some value, inasmuch as it is a generally accepted corollary of the principle of evolution that variation from type diminishes with increasing environmental pressure upon the type. In terms of social causation, this means that increasing social pressure, manifesting itself in law, tends to create uniformity of conduct. Some indication of the extent to which this actually happens should be afforded by the standard deviations.

I hope in a subsequent paper to present a number of detailed tables, with actual index numbers of social pressure, for certain American commonwealths, and in connection with them to touch upon various questions of interpretation.

THE BILL FOR THE THIRTEENTH CENSUS.

BY WALTER F. WILLCOX.

The most important piece of legislation regarding the Federal Census between the insertion in the Constitution of the provision requiring a census and the present time is the law passed in 1899, providing for the Twelfth Census of the United States. The Censuses of 1880 and 1890 had been so overloaded with subsidiary investigations that both the accuracy and the speed of the fundamental census inquiries had been impaired. The law of 1899 divided all inquiries which theretofore had been taken in connection with a decennial census into two classes, those requiring the assistance of the army of Federal enumerators appointed every ten years, and those not requiring such co-operation. The former class included only the census of population, of deaths, of farms, and of manufacturing establishments. The latter class included all other census inquiries. The law of 1899 required the inquiries of the former class to be pushed to completion before any inquiries of the latter class were begun, and set a date—July 1, 1902—at which the inquiries of the first class must be finished. These instructions were carried out by the Census Office, and the main results of the census proper were given to the public with a speed previously unknown. But this legislation incidentally paved the way for the establishment of a permanent Census Office,—a step which was taken in 1902. That office was charged with carrying on the inquiries which at previous censuses had been taken in connection with the decennial count, but which had been postponed under the legislation of 1899 until after the census proper was finished. The permanent Census Office, established in 1902, has been engaged from that time to the present largely in the prosecution of inquiries which have heretofore been taken as a part of a decennial census. Such inquiries include the Report on Wealth, Debt, and Taxation (1907); a continua-

tion of the volumes on the same subject included in the Census of 1880 and 1890; the Census of the Defective, Dependent, and Delinquent Classes,—namely, the Blind and Deaf (1906); the Insane and Feeble-minded (1906); Benevolent Institutions (1905); Paupers in Almshouses (1906); Prisoners and Juvenile Delinquents (1907); and a Report on Mines and Quarries (1902). A Census of Religious Bodies, continuing the volume on the Statistics of Churches, published as a part of the Census of 1890, is now in progress. All these inquiries have been heretofore taken as part of a decennial census.

It is unnecessary to mention here also the large number of additional inquiries which have been ordered by Congress and assigned to the Census Office. Investigations of this nature are frequently needed; and, had there been no permanent Census Office, they probably would have been undertaken by the Bureau of Labor or some other agency.

The bill recently reported by the Committee on the Census of the House of Representatives follows in all essentials the original changes introduced by the law of 1899. Like that law, it limits the enumeration strictly to four subjects, relegating other decennial inquiries to the interval between the censuses. One of the inquiries of 1899, that into deaths in the general population, has been dropped. The reasons are twofold. Fifty years of experiment from 1850 to 1900 has established with certainty the fact that not more than seven-tenths of all the deaths which occur in a given community during a year can be obtained by enumerators asking at the close of that year of each family a report of any deaths which had occurred therein during the preceding twelve months. Tables so imperfect have very little statistical or medical value, and are constantly misunderstood by the public. So wide a margin of error in one branch of the census tends also to discredit more accurate results reached in other divisions. Furthermore, the Federal Census, acting in co-operation with the states and cities having trustworthy local registers of deaths, is now annually publishing returns for about one-half the population of the country, which probably cover 95 per cent. of all deaths occurring within that region,

and furnish a far better index to the death-rate in the whole country than enumerators' returns for the United States could do.

While this inquiry into deaths outside the registration area is likely to be discontinued, it is proposed to add one other inquiry,—that into mines and mining. This is done because the past experience of the Census Office shows that the line between manufacturing, on the one hand, and mining or quarrying, on the other, is one almost impossible for the Census Office to draw, and that the difficulties in doing so are steadily increasing.

Like the law of 1899, the present draft requires the results of the census to be published by the summer of 1912, and thus prohibits the office from extending its publications into the seventh or eighth year after the census day, as had been done at certain previous censuses.

When the law of 1899 was under discussion, a radical difference of opinion developed between the Senate and the House of Representatives. The House, feeling convinced that the delays in completing and publishing the results of the Censuses of 1880 and 1890 had been due in large measure to a lack of authority and independent control exercised by the Superintendent of the Census and to his inability to secure action from his superior officer in many cases with the promptness which the emergency demanded, was insistent that the Census Office should be made entirely independent of any member of the Cabinet and responsible only to the President. In this position they had the hearty and general support of statistical experts throughout the country and of all who had had previous experience in census work.

In the Senate the bill as originally offered by the Committee on the Census had contained a similar provision, but it had been so amended in the course of discussion as to place the Census Office under the Secretary of the Interior. This was the main difference which produced a disagreement between the two Houses and resulted in a conference on the bill. Through that agency a compromise was made whereby the Census Office was left within the Department of the Interior, but given a far

greater degree of autonomy than is usual for administrative bureaus. The Director of the Census appointed all his subordinates except the Assistant Director, had his own disbursing office, controlled directly his own printing, and possessed thus a very high degree of independence. On the other hand, he reported annually to the Secretary of the Interior, transmitted his requests for appropriations to that officer for Congress, and in minor respects was subject to his control and supervision.

In this respect, as in all others of the first importance, the pending bill follows the precedent established in 1899. It is not surprising that the Secretary of Commerce and Labor, to whose department the Census Office was transferred in 1903, believes that its relation to his department should be analogous to that of the other bureaus. In a letter dated February 7, 1908, addressed to the Chairman of the Committee on the Census of the House of Representatives,* the Secretary writes, "It places a chief of a bureau within the Department of Commerce and Labor upon a footing practically independent of the supervisory jurisdiction of the head of the Department, which is a departure from a well-established plan of organization of the Executive Departments of the Government, and, in my judgment, will lead to undesirable and unsatisfactory results."

In another part of the same letter he adds that it "would constitute an administrative anomaly, which, it is believed, it is not the purpose of Congress to create."

There is no doubt that such an organization is, as the Secretary calls it, "a departure from a well-established plan of organization" and also an "administrative anomaly"; but the compromise thus established in 1899 was found to be satisfactory. The traditional method of organization which had been followed by the laws of 1879 and 1889 had proved unsatisfactory and practically unworkable. It is the belief of every one who has had practical experience with census work that the conditions themselves are anomalous, and that their requirements cannot be met by following administrative routine in this particular.

*Hearings before the Committee on the Census of the House of Representatives, pp. 97-101.

The law of 1899 gave the Census Office for the first time that degree of initiative and autonomy which the rigid requirements of its emergency work made necessary. Experience has shown that the Director of the Census must be given somewhat the same independence that is accorded to a general commanding an entire army in time of war. It is to be hoped that the precedent of 1899 will commend itself to the deliberate judgment of Congress, and be followed in the bill now before it for consideration.

Probably the most important new feature in the draft of the Census Bill is the provision for an almost automatic transfer of the Census Office from a status closely approaching that of the ordinary bureau, which it maintains during the seven years intervening between the decennial censuses, to the unusual condition requisite during the three years when the decennial census is being taken. The period from July 1, 1909, to July 1, 1912, is named the decennial census period. During that period the law provides for an Assistant Director, a fifth Chief Statistician, and such other clerks of various classes as may be found necessary. During that period also the Director of the Census may promote or transfer persons from the temporary roll of employees holding office only during the decennial period to the permanent force and *vice versa*. The whole office works thus as one organization, its energies and personnel being devoted in part to the decennial census, in part to the routine work of the permanent office, as the needs of the work require. The funds, like the personnel, are entirely under the control of the Director. During those three years there are no annual appropriations for any work of the office, but all its expenses are to be met out of a single lump appropriation. For the three years a sum of \$14,000,000 is provided. During this period the responsibility and the initiative are concentrated in the hands of the Director, and he is solely responsible for the rapid and effective progress of the work. The work of the decennial census must be completed by the end of this decennial census period, and the office then returns to its normal condition. The temporary employees having no standing on the Civil

Service roll lose their positions in 1912,¹ and the office reverts to what may be called a peace footing.

It is proposed to change the census day from June 1 to April 15. June 1 is so late in the summer that many persons have left their usual places of residence, their houses are closed, and it is extremely difficult to obtain information about them either from the neighbors or by correspondence. This source of danger and of error to a census is increasing with each decade. If a census can be taken in Canada in April, as it has been for decades past, there seems no reason to believe that this date would furnish insurmountable difficulties to the field work in the United States; and there is no doubt that April 15 is a far better date than June 1. It is probably also better than any other date which has been suggested.

These are the main features of statistical rather than of administrative importance embodied in the bill in its present form. A copy of that draft is appended for comparison with the law in the form in which it shall be finally passed. The copy is that of the Crumpacker Bill as reported by the Committee on the Census to the House of Representatives on Feb. 17, 1908.

A BILL

TO PROVIDE FOR THE THIRTEENTH AND SUBSEQUENT DECENNIAL CENSUSES.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a census of the population, agriculture, manufactures, and mines and quarries of the United States shall be taken by the Director of the Census in the year nineteen hundred and ten and once every ten years thereafter. The census herein provided for shall include each State and Territory on the mainland of the United States, the District of Columbia, and the Territories of Alaska, Hawaii, and Porto Rico, and Guam, Samoa, and the Panama Canal Zone.

SEC. 2. That the period of three years beginning the first day of July next preceding the census provided for in section one of this Act shall be known as the decennial census period, and the reports upon the inquiries provided for in said section shall be completed and published within such period.

SEC. 3. That after June thirtieth, nineteen hundred and nine, there may be employed in the Census Office, in addition to the force provided for by the Act of March sixth, nineteen hundred and two, entitled "An Act to provide for a permanent Census Office," an Assistant Director, who shall be an experienced practical statistician; a chief statistician, who shall be a person of known and tried experience in statistical work, an appointment clerk, a private secretary to the Director, two stenographers, and eight expert chiefs of division. These officers, with the exception of the Assistant Director, shall be appointed without examination by the Secretary of Commerce and Labor upon the recommendation of the Director of the Census. The Assistant Director shall be appointed by the President, by and with the advice and consent of the Senate.

SEC. 4. That the Assistant Director shall perform such duties as may be prescribed by the Director of the Census. In the absence of the Director the Assistant Director shall serve as Director, and in the absence of the Director and Assistant Director the chief clerk shall serve as Director.

The appointment clerk shall perform the appointment duties assigned to the disbursing clerk in section four of the Act entitled "An Act to provide for a permanent Census Office," approved March sixth, nineteen hundred and two. The disbursing clerk of the Census Office shall, at the beginning of the decennial census period, give additional bond to the Secretary of the Treasury in the sum of one hundred thousand dollars, surety to be approved by the Solicitor of the Treasury, which bond shall be conditioned that the said officer shall render, quarter yearly, a true and faithful account to the proper accounting officers of the Treasury of all moneys and properties which shall be received by him by virtue of his office during the said decennial census period. Such bond shall be filed in the office of the Secretary of the Treasury, to be by him put in suit upon any breach of the conditions thereof.

SEC. 5. That during the decennial census period the annual compensation of the officials of the Census Office shall be as follows: The Director of the Census, seven thousand five hundred dollars; the private secretary to the Director, two thousand five hundred dollars; the Assistant Director, five thousand dollars; the chief statisticians, three thousand five hundred dollars each; the chief clerk, three thousand dollars; the disbursing clerk, three thousand dollars; the appointment clerk, three thousand dollars; the geographer, two thousand seven hundred and fifty dollars; the chiefs of division, two thousand two hundred and fifty dollars each; and the stenographers provided for in section three of this Act, two thousand dollars each.

SEC. 6. That in addition to the force hereinbefore provided for and to that already authorized by law there may be employed in the Census Office

during the decennial census period, and no longer, as many clerks of classes four, three, two, and one; as many clerks, copyists, computers, and skilled laborers, with salaries at the rate of not less than six hundred dollars nor more than one thousand dollars per annum, and as many messengers, assistant messengers, messenger boys, watchmen, unskilled laborers, and charwomen, as may be found necessary for the proper and prompt performance of the duties herein required, these additional clerks and employees to be appointed by the Director of the Census: *Provided*, That the total number of such additional clerks of classes two, three, and four shall at no time exceed one hundred: *And provided further*, That employees engaged in the compilation or tabulation of statistics by the use of mechanical devices may be compensated on a piece-price basis to be fixed by the Director.

SEC. 7. That the additional clerks and other employees provided for in section six shall be subject to such noncompetitive examination as the Director of the Census may prescribe, the said examination to be conducted by the United States Civil Service Commission: *Provided*, That they shall be selected without regard to the law of apportionment or to the political party affiliations of the applicants, and that preference may be given to persons having previous experience in census work whose efficiency records are satisfactory to the said Director, who may, in his discretion, accept such records in lieu of said examination: *And provided further*, That employees in other branches of the departmental service who have had previous experience in census work may be transferred without examination to the Census Office to serve during the whole or a part of the decennial census period, and at the end of such service the employees so transferred shall be eligible to appointment to positions of similar grade in any Department without examination: *And provided further*, That during the decennial census period and no longer the Director of the Census may fill vacancies in the permanent force of the Census Office by the promotion or transfer of clerks or other employees employed on the temporary force authorized by section six of this Act: *And provided further*, That at the expiration of the decennial census period the term of service of all employees so transferred and of all other temporary officers and employees appointed under the provisions of this Act shall terminate, and such officers and employees shall not thereafter be eligible to appointment or transfer into the classified service of the Government by virtue of their examination or appointment under this Act.

SEC. 8. That the Thirteenth Census shall be restricted to inquiries relating to population, to agriculture, to manufactures, and to mines and quarries. The schedules relating to population shall include for each inhabitant the name, relationship to head of family, color, sex, age, conjugal condition, place of birth, place of birth of parents, number of

years in the United States, citizenship, occupation, school attendance, literacy, and tenure of home

The schedules relating to agriculture shall include name of occupant of each farm, color of occupant, tenure, acreage of farm, value of farm and improvements, value of farm implements, number and value of live stock on farms and ranges, number and value of domestic animals not on farms and ranges, and the acreage of crops as of the date of enumeration, and the acreage of crops and the quantity and value of crops and other farm products for the year ending December thirty-first next preceding the enumeration.

The schedules of inquiries relating to manufactures and to mines and quarries shall include the name and location of each establishment; character of organization, whether individual, co-operative, or other form; character of business or kind of goods manufactured; amount of capital invested; number of proprietors, firm members, copartners, stockholders, and officers and the amount of their salaries; number of employees and the amount of their wages; quantity and cost of materials used in manufactures; amount of miscellaneous expenses; quantity and value of products; time in operation during the census year; character and quantity of power used, and character and number of machines employed.

The census of manufactures and of mines and quarries shall relate to the year ending December thirty-first next preceding the enumeration of population and shall be confined to mines and quarries and manufacturing establishments which were in active operation during all or a portion of that year and had a product valued at five hundred dollars or more. The census of manufactures shall furthermore be confined to manufacturing establishments conducted under what is known as the factory system, exclusive of the so-called neighborhood or household industries.

Whenever he shall deem it expedient, the Director of the Census may charge the collection of these statistics upon the special agents or upon detailed employees, to be employed without respect to locality.

The form and subdivision of inquiries necessary to secure the information under the foregoing topics shall be determined by the Director of the Census.

SEC. 9. That the Director of the Census shall, at least one year prior to the date fixed for commencing the enumeration at the Thirteenth and each succeeding decennial census, designate the number, whether one or more, of supervisors of census for each State and Territory, the District of Columbia, Alaska, the Hawaiian Islands, Porto Rico, Guam, Samoa, and the Panama Canal Zone, and shall define the districts within which they are to act. The supervisors shall be appointed by the President, by and with the advice and consent of the Senate: *Provided*, That the whole number of supervisors shall not exceed three hundred and thirty:

And provided further, That so far as practicable and desirable the boundaries of the supervisors' districts shall conform to the boundaries of the Congressional districts: *And provided further*, That if in any supervisor's district the supervisor has not been appointed and qualified ninety days preceding the date fixed for the commencement of the enumeration, or if any vacancy shall occur thereafter, either through death, removal, or resignation of the supervisor, or from any other cause, the Director of the Census may appoint a temporary supervisor or detail an employee of the Census Office to act as supervisor for that district.

SEC. 10. That each supervisor of census shall be charged with the performance, within his own district, of the following duties: To consult with the Director of the Census in regard to the division of his district into subdivisions most convenient for the purpose of the enumeration, which subdivisions or enumeration districts shall be defined and the boundaries thereof fixed by the Director of the Census; to designate to the Director suitable persons, and, with his consent, to employ such persons as enumerators, one or more for each subdivision; to communicate to enumerators the necessary instructions and directions relating to their duties; to examine and scrutinize the returns of the enumerators, and in the event of discrepancies or deficiencies appearing in any of the said returns to use all diligence in causing the same to be corrected or supplied; to forward the completed returns of the enumerators to the Director at such time and in such manner as shall be prescribed, and to make up and forward to the Director the accounts of each enumerator in his district for service rendered, which accounts shall be duly certified to by the enumerator, and the same shall be certified as true and correct, if so found, by the supervisor, and said accounts so certified shall be accepted and paid by the Director. The duties imposed upon the supervisor by this Act shall be performed in any and all particulars in accordance with the orders and instructions of the Director of the Census.

SEC. 11. That each supervisor of the census shall, upon the completion of his duties to the satisfaction of the Director of the Census, receive a sum based upon the population of his district, in accordance with the following rates for each thousand or major fraction of a thousand: One dollar and fifty cents per thousand in each district having more than seven hundred and fifty thousand inhabitants; two dollars per thousand in each district having five hundred thousand to seven hundred and fifty thousand inhabitants; two dollars and fifty cents per thousand in each district having four hundred thousand to five hundred thousand inhabitants; three dollars per thousand in each district having three hundred thousand to four hundred thousand inhabitants; three dollars and fifty cents per thousand in each district having two hundred thousand to three hundred thousand inhabitants; and four dollars per thousand in

each district having less than two hundred thousand inhabitants. In addition to such compensation each supervisor shall receive the sum of five hundred dollars, which sum, in the discretion of the Director of the Census, may be paid to any supervisor prior to the completion of his duties in one or more payments, as the Director of the Census may determine, such sums to be in full compensation for all services rendered and expenses incurred by him: *Provided*, That if the aggregate compensation of any supervisor as herein provided for amounts to less than one thousand two hundred dollars the Director of the Census shall pay such supervisor a sum sufficient to make his compensation amount to one thousand two hundred dollars: *Provided further*, That in emergencies arising in connection with the work of preparation for, or during the progress of, the enumeration in his district, or in connection with the re-enumeration of any subdivision, a supervisor may, in the discretion of the Director of the Census, be allowed actual and necessary travelling expenses and an allowance in lieu of subsistence not exceeding four dollars per day during his necessary absence from his usual place of residence: *And provided further*, That an appropriate allowance to supervisors for clerk hire may be made when deemed necessary by the Director of the Census.

SEC. 12. That each enumerator shall be charged with the collection in his subdivision of the facts and statistics required by the population and agricultural schedules and such other schedules as the Director of the Census may determine shall be used by him in connection with the census, as provided in section eight of this Act. It shall be the duty of each enumerator to visit personally each dwelling house in his subdivision, and each family therein, and each individual living out of a family in any place of abode, and by inquiry made of the head of each family, or of the member thereof deemed most competent and trustworthy, or of such individual living out of a family, to obtain each and every item of information and all particulars required by this Act as of date April fifteenth of the year in which the enumeration shall be made; and in case no person shall be found at the usual place of abode of such family, or individual living out of a family, competent to answer the inquiries made in compliance with the requirements of this Act, then it shall be lawful for the enumerator to obtain the required information as nearly as may be practicable from families or persons living in the neighborhood of such place of abode. It shall be the duty also of each enumerator to forward the original schedules, properly filled out and duly certified, to the supervisor of his district as his returns under the provisions of this Act; and in the event of discrepancies or deficiencies being discovered in these schedules he shall use all diligence in correcting or supplying the same. In case an enumeration district embraces all or any part of any incorporated borough, village, town, or city, and also other territory not

included within the limits of such incorporated borough, village, town, or city, it shall be the duty of the enumerator to clearly and plainly distinguish and separate, upon the population schedules, the inhabitants of such borough, village, town, or city from the inhabitants of the territory not included therein. No enumerator shall be deemed qualified to enter upon his duties until he has received from the supervisor of the district to which he belongs a commission, signed by the supervisor, authorizing him to perform the duties of an enumerator, and setting forth the boundaries of the subdivision within which such duties are to be performed.

SEC. 13. That the territory assigned to each supervisor shall be divided into as many enumeration districts as may be necessary to carry out the purposes of this Act and, in the discretion of the Director of the Census, two or more enumeration districts may be given to one enumerator, but the district, or districts, assigned to any enumerator shall not include more than two thousand inhabitants, according to estimates based on the preceding census or other reliable information, and the boundaries of all the enumeration districts shall be clearly described by civil divisions, rivers, roads, public surveys, or other easily distinguishable lines: *Provided*, That enumerators may be assigned for the special enumeration of institutions, when desirable, without reference to the number of inmates.

SEC. 14. That any supervisor of census may, with the approval of the Director of the Census, remove any enumerator in his district and fill the vacancy thus caused or otherwise occurring. Whenever it shall appear that any portion of the census provided for in this Act has been negligently or improperly taken, and is by reason thereof incomplete or erroneous, the Director of the Census may cause such incomplete and unsatisfactory enumeration and census to be amended or made anew.

SEC. 15. That the Director of the Census may authorize and direct supervisors of census to employ interpreters to assist the enumerators of their respective districts in the enumeration of persons not speaking the English language, but no authorization shall be given for such employment in any district until due and proper effort has been made to secure an enumerator who can speak the language or languages for which the services of an interpreter would otherwise be required. The compensation of such interpreters shall be fixed by the Director of the Census in advance, and shall not exceed five dollars per day for each day actually and necessarily employed.

SEC. 16. That the compensation of enumerators shall be determined by the Director of the Census as follows: In subdivisions where he shall deem such remuneration sufficient, an allowance of not less than two nor more than four cents for each inhabitant; not less than twenty nor more

than thirty cents for each farm reported; ten cents for each barn and inclosure containing live stock not on farms, and not less than twenty nor more than thirty cents for each establishment of productive industry. In other subdivisions per diem rates shall be fixed by the Director according to the difficulty of enumeration, having special reference to the regions to be canvassed and the sparsity of settlement or other considerations pertinent thereto. The compensation allowed to an enumerator in any such district shall be not less than three nor more than six dollars per day of eight hours actual field work, and no payment shall be made for time in excess of eight hours for any one day. The subdivisions or enumeration districts to which the several rates of compensation shall apply shall be designated by the Director of the Census at least two weeks in advance of the enumeration. No claim for mileage or travelling expenses shall be allowed any enumerator in either class of subdivisions, except in extreme cases, and then only when authority has been previously granted by the Director of the Census; and the decision of the Director as to the amount due any enumerator shall be final.

SEC. 17. That in the event of the death of any supervisor or enumerator after his appointment and entrance on his duties, the Director of the Census is authorized to pay to his widow or his legal representative such sum as he may deem just and fair for the services rendered by such supervisor or enumerator.

SEC. 18. That special agents may be appointed by the Director of the Census to carry out the provisions of this Act and of the Act to provide for a permanent Census Office approved March sixth, nineteen hundred and two, and Acts amendatory thereof or supplemental thereto. The special agents thus appointed shall have like authority with the enumerators in respect to the subjects committed to them under this Act, and shall receive compensation at rates to be fixed by the Director of the Census: *Provided*, That the same shall in no case exceed six dollars per day and actual necessary travelling expenses, and an allowance in lieu of subsistence not exceeding four dollars per day during necessary absence from their usual place of residence: *Provided further*, That no pay or allowance in lieu of subsistence shall be allowed special agents when employed in the Census Office on other than the special work committed to them, and no appointments of special agents shall be made for clerical work: *And provided further*, That the Director of the Census shall have power, and is hereby authorized, to appoint special agents to assist the supervisors whenever he may deem it proper, in connection with the work of preparation for, or during the progress of, the enumeration or in connection with the re-enumeration of any district or a part thereof; or he may, in his discretion, employ for this purpose any of the permanent or temporary employees of the Census Office: *And provided further*,

That the Director of the Census may, in his discretion, fix the compensation of special agents on a piece-price basis.

SEC. 19. That every supervisor, supervisor's clerk, enumerator, interpreter, special agent, or other employee shall take and subscribe to an oath or affirmation, to be prescribed by the Director of the Census. All appointees and employees provided for in this Act shall be appointed or employed, and examined, if examination is required by this Act, solely with reference to their fitness to perform the duties required of them by the provisions of this Act, and without reference to their political party affiliations.

SEC. 20. That the enumeration of the population required by section one of this Act shall be taken as of the fifteenth day of April; and it shall be the duty of each enumerator to commence the enumeration of his district on that day, unless the Director of the Census in his discretion shall defer the enumeration in said district by reason of climatic or other conditions which would materially interfere with the proper conduct of the work; but in any event it shall be the duty of each enumerator to prepare the returns hereinbefore required to be made, and to forward the same to the supervisor of his district, within thirty days from the commencement of the enumeration of his district: *Provided*, That in any city having five thousand inhabitants or more under the preceding census the enumeration of the population shall be commenced on the fifteenth day of April aforesaid and shall be completed within two weeks thereafter.

SEC. 21. That if any person shall receive or secure to himself any fee, reward, or compensation as a consideration for the appointment or employment of any person as enumerator or clerk or other employee, or shall in any way receive or secure to himself any part of the compensation paid to any enumerator or clerk or other employee, he shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not more than three thousand dollars and be imprisoned not more than five years.

SEC. 22. That any supervisor, supervisor's clerk, enumerator, interpreter, special agent, or other employee, who, having taken and subscribed the oath of office required by this Act, shall, without justifiable cause, neglect or refuse to perform the duties enjoined on him by this Act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding five hundred dollars; or if he shall, without the authority of the Director of the Census, publish or communicate any information coming into his possession by reason of his employment under the provisions of this Act, or the Act to provide for a permanent Census Office, or Acts amendatory thereof or supplemental thereto, he shall be guilty of a misdemeanor and shall upon conviction thereof

be fined not to exceed one thousand dollars, or be imprisoned not to exceed two years, or both so fined and imprisoned, in the discretion of the court; or if he shall wilfully and knowingly swear to or affirm falsely he shall be deemed guilty of perjury, and upon conviction thereof shall be imprisoned not exceeding five years and be fined not exceeding two thousand dollars; or if he shall wilfully and knowingly make a false certificate or a fictitious return, he shall be guilty of a misdemeanor, and upon conviction of either of the last-named offenses he shall be fined not exceeding two thousand dollars and be imprisoned not exceeding five years; or if any person who is or has been an enumerator shall knowingly or wilfully furnish, or cause to be furnished, directly or indirectly, to the Director of the Census, or to any supervisor of the census, any false statement or false information with reference to any inquiry for which he was authorized and required to collect information, he shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding two thousand dollars and be imprisoned not exceeding five years.

SEC. 23. That it shall be the duty of all persons over twenty-one years of age when requested by the Director of the Census, or by any supervisor, enumerator, or special agent, or other employee of the Census Office, acting under the instructions of the said Director, to answer correctly, to the best of their knowledge, all questions on the census schedules applying to themselves and to the family to which they belong or are related, and to the farm or farms of which they or their families are the occupants; and any person over twenty-one years of age who, under the conditions hereinbefore stated, shall refuse or wilfully neglect to answer any of these questions, or shall wilfully give answers that are false, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding one hundred dollars.

And it shall be the duty of every owner, proprietor, manager, superintendent, or agent of a hotel, apartment house, boarding or lodging house, tenement, or other building, when requested by the Director of the Census, or by any supervisor, enumerator, special agent, or other employee of the Census Office, acting under the instructions of the said Director, to furnish the names of the occupants of said hotel, apartment house, boarding or lodging house, tenement, or other building, and to give thereto free ingress and egress to any duly accredited representative of the Census Office, so as to permit of the proper and correct enumeration of all persons having their usual place of abode in said hotel, apartment house, boarding or lodging house, tenement, or other building; and any owner, proprietor, manager, superintendent, or agent of a hotel, apartment house, boarding or lodging house, tenement, or other building who shall refuse or wilfully neglect to give such information

or assistance under the conditions hereinbefore stated shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding five hundred dollars.

SEC. 24. And it shall be the duty of every owner, president, treasurer, secretary, director, or other officer or agent of any manufacturing establishment, mine, quarry, or other establishment of productive industry, whether conducted as a corporation, firm, limited liability company, or by private individuals, when requested by the Director of the Census or by any supervisor, enumerator, special agent, or other employee of the Census Office, acting under the instructions of the said Director, to answer completely and correctly to the best of his knowledge all questions on any census schedule applying to such establishment; and any owner, president, secretary, director, or other officer or agent of any manufacturing establishment, mine, quarry, or other establishment of productive industry, who under the conditions hereinbefore stated shall refuse or wilfully neglect to answer any of these questions, or shall wilfully give answers that are false, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding ten thousand dollars, or imprisoned for a period not exceeding one year, or both so fined and imprisoned, at the discretion of the court. The provisions of this section shall also apply to the collection of the information required and authorized by the Act entitled "An Act to provide for a permanent Census Office," and by Acts amendatory thereof or supplemental thereto.

SEC. 25. That the information furnished under the provisions of the next preceding section shall be used only for the statistical purposes for which it is supplied. No publication shall be made by the Census Office whereby the data furnished by any particular establishment can be identified, nor shall the Director of the Census permit any one other than the sworn employees of the Census Office to examine the individual reports.

SEC. 26. That all fines and penalties imposed by this Act may be enforced by indictment or information in any court of competent jurisdiction.

SEC. 27. That the Director of the Census may authorize the expenditure of necessary sums for the actual and necessary travelling expenses of the officers and employees of the Census Office, including an allowance in lieu of subsistence not exceeding four dollars per day during their necessary absence from the Census Office, or, instead of such an allowance, their actual subsistence expenses, not exceeding five dollars per day; and he may authorize the incidental, miscellaneous, and contingent expenses necessary for the carrying out of this Act, as herein provided, and not otherwise, including advertising in newspapers, the purchase of books of reference and periodicals, the rental of sufficient quarters in the

District of Columbia or elsewhere and the furnishing thereof, and expenditures necessary for the compiling, printing, publishing, and distributing the results of the census, and purchase of necessary paper and other supplies, the purchase, rental, construction, and repair of mechanical appliances, the compensation of such permanent and temporary clerks as may be employed under the provisions of this Act and the Act establishing the permanent Census Office and Acts amendatory thereof or supplemental thereto, and all other expenses incurred under authority conveyed in this Act.

SEC. 28. That the Director of the Census is hereby authorized to make requisition upon the Public Printer for such printing as may be necessary to carry out the provisions of this Act, to wit: Blanks, schedules, circulars, pamphlets, envelopes, work sheets, and other items of miscellaneous printing; that he is further authorized to have printed by the Public Printer, in such editions as the Director may deem necessary, preliminary and other Census bulletins, and final reports of the results of the several investigations authorized by this Act, or by the Act to establish a permanent Census Office and Acts amendatory thereof or supplemental thereto, and to publish and distribute said bulletins and reports.

SEC. 29. That all mail matter, of whatever class, relating to the census and addressed to the Census Office, or to any official thereof, and indorsed "Official business, Census Office," shall be transmitted free of postage, and by registered mail if necessary, and so marked: *Provided*, That if any person shall make use of such indorsement to avoid the payment of postage or registry fee on his or her private letter, package, or other matter in the mail, the person so offending shall be guilty of a misdemeanor and subject to a fine of three hundred dollars, to be prosecuted in any court of competent jurisdiction.

SEC. 30. That the Secretary of Commerce and Labor, whenever he may deem it advisable, or on request of the Director of the Census, is hereby authorized to call upon any other department or office of the Government for information pertinent to the work herein provided for.

SEC. 31. That there shall be in the year nineteen hundred and fifteen, and once every ten years thereafter, a census of agriculture and live stock, which shall show the acreage of farm land, the acreage of the principal crops, and the number and value of domestic animals on the farms and ranges of the country. The schedule employed in this census shall be prepared by the Director of the Census. Such census shall be taken as of October first, and shall relate to the current year. The Director of the Census may appoint enumerators or special agents for the purpose of this census, in accordance with the provisions of the permanent Census Act.

SEC. 32. That the Director of the Census is hereby authorized, at

his discretion, upon the written request of the governor of any State or Territory, or of a court of record, to furnish such governor or court of record with certified copies of so much of the population returns as may be requested, upon the payment of the actual cost of making such copies, and one dollar additional for certification; and that the Director of the Census is further authorized, in his discretion, to furnish to individuals such data from the population schedules as may be desired for genealogical or other proper purposes, upon payment of the actual cost of searching the records and one dollar for supplying a certificate; and the amounts so received shall be covered into the Treasury of the United States, to be placed to the credit of, and in addition to, the appropriations made for taking the census.

SEC. 33. That the Act establishing the permanent Census Office, approved March sixth, nineteen hundred and two, and Acts amendatory thereof and supplemental thereto, except as are herein amended, shall remain in full force. That the Act entitled "An Act to provide for taking the Twelfth and subsequent censuses," approved March third, eighteen hundred and ninety-nine, and all other laws and parts of laws inconsistent with the provisions of this Act are hereby repealed.

NOTES ON THE FINANCIAL PANIC OF 1907.

BY FRANCIS B. FORBES.

The accompanying tables give a condensed record, between January 1907, and January 1908, of the New York quotations for eight railroad and eight industrial stocks. It is by no means claimed that these special stocks represent an average of everything listed by the New York Stock Exchange, since the only reason for their selection, early in the critical period, was that they were all ranked as steady dividend payers. On the other hand, as the outstanding stock capital of the eight railroad companies aggregates some \$1,778,000,000, and that of the eight industrials some \$1,329,000,000 (including Calumet and Hecla at the nominal par value of only \$2,500,000), it can be seen that the figures of these few stocks must have an undoubted significance. And it must be remembered that, if the stock capital of all the subsidiary companies leased or controlled by the sixteen in our list had been included, the aggregate would have been even more imposing.

Table A, for Railroads, and Table B, for Industrials, give the following facts for each stock:—

(1) The *highest quotations* in 1907, which were all in the month of January (except Calumet and Hecla in February).

(2) The *lowest quotations* during the crisis, ranging between October 23 and November 27, with each lowest quotation represented as a percentage of the corresponding highest point.

(3) The *recovery* on Jan. 17, 1908, a date selected because the premium on currency had then disappeared and because the January dividends had then been paid out. The degree of recovery on that date is shown for each stock in the percentage borne by its quotation to that of its lowest point, and comparison between January 1907, and January 1908, is also made by giving the latter prices as percentages of the former.

All quotations have been taken from the *Financial Chronicle*, those for Jan. 17, 1908, being an average of the quoted ranges for the day.

The two tables show that the average percentages of decline and of recovery from the respective lowest points run very closely together for both Railroads and Industrials; while the averages of prices on Jan. 17, 1908, are, within a small fraction, 26½% below the highest points of the previous year for each group. This may, perhaps, indicate that the stocks selected for the two tables are, on the whole, fairly representative of general conditions. On the other hand, it appears, not only that the average percentages of both decline and recovery have been greatest

in Industrials, but that the extreme range between highest and lowest points is also to be found in this group.

The *maximum decline* was for:—

Railroads:

Northern Pacific from 189.5 to 100.5, or 47%.

Industrials:

United States Steel common from 50.4 to 21.9, or 56.5%.

The *minimum decline* was for:—

Railroads:

Southern Pacific preferred from 118.1 to 100, or 15.3%.

Industrials:

American Sugar Refining preferred from 131 to x.106, or 19.1%.

The *maximum recovery* was for:—

Railroads:

Northern Pacific from 100.5 to 127.5, or 26.8%.

Industrials:

General Electric from 89.5 to 121.5, or 35.8%.

The *minimum recovery* was for:—

Railroads:

Southern Pacific preferred from 100 to 110.5, or 10.5%.

Industrials:

American Sugar Refining preferred from x.106 to 111, or 4.7%.

Comparing prices on Jan. 17, 1908, with the highest of a year before,—

The *greatest fall* is in:—

Railroads:

Great Northern preferred from 189.7 to 123.5, or 34.9%.

Industrials:

United States Steel common from 50.4 to 29.6, or 41.3%.

The *least fall* is in:—

Railroads:

Southern Pacific preferred from 118.1 to 110.5, or 6.4%.

Industrials:

United States Steel preferred from 107.7 to 94.0, or 12.7%.

No useful purpose can be served by attempting too close an analysis of such tables as these. However, the Industrial group is sharply divided into three categories of enterprise, dealing respectively with electricity, metals, and food, and a comparison of these may have some interest.

Electricity. During the crisis the totals of American Telephone and General Electric quotations averaged 40% below the highest points: their average recovery was 30% from the lowest; and on Jan. 17, 1908, they averaged 22% below prices of a year before. Of the two General Electric showed a decline of 45% against only 34% on the part of American Telephone, but a recovery of 36% (the highest percentage of the two lists) against only 24½% in the case of the other. Finally, Jan. 17, 1908

finds American Telephone only about 18%, while General Electric was 25½% below the highest point of 1907. The contrasts are between a public service and a manufacturing corporation.

Metals. The average decline of the four stocks during the crisis was 44% and the recovery over 24%, leaving their average value on Jan. 17, 1908, lower by 30% than the highest point. But here must be noted the greatest decline in any stock of the two tables, that of United States Steel common from 50.4 in January 1907, to 21.9 on October 23, amounting to 56½%. This stock, however, recovered by 35% (or nearly as much as General Electric), leaving its value on Jan. 17, 1908, still 41% below the highest point. United States Steel preferred had a narrower range, declining only by 26½%, and recovering by 19% to a value only 12½% below that of a year before. American Smelting and Refining preferred fell 30%, and recovered over 14%, with a value on Jan. 17, 1908, some 20% below January 1907. Calumet and Hecla declined by 46½% (15% more than American Smelting preferred), but recovered by 26% to a point 32½% below its highest quotation.

Food. The averages of this group show a decline of some 26%, a recovery of 15%, with quotations on Jan. 17, 1908, only 15½% below those of a year before. It is noteworthy that American Sugar Refining preferred shows the smallest percentages in the two lists, both of decline and of recovery, the lowest quotations being only 19.1% below those of January 1907, with a recovery of only 4.7%. The fluctuations of Swift & Co. stock were more pronounced, the decline being to a point 33½% below the highest, and the recovery 29½%; while its quotations on Jan. 17, 1908, were about 1½% nearer those of a year before than American Sugar Refining preferred.

In the Industrial Stocks, then, as was to be expected, we find the greatest fluctuations and the least average recovery in the metal section, with iron and copper as the dominant factors. The electric section has not suffered so much, while the companies representing food—the two greatest food “trusts”—have lost less ground than the others.

As will have been seen, nothing more has been attempted in these notes than to record the lowest quotations and the degree of recovery for a few well-known stocks during the régime of “clearing-house certificates”; that is, for the two months when cash payments were partially suspended by the banks. But each reader must be left to gauge for himself the significance of these figures, as well as of the distinct set-back in stock prices since the 17th of January last. It must be remembered that I have dealt with only one phase of a still enduring crisis, and that no one can yet say how much longer its liquidation may last. For among the forces at work there are some whose energy must elude forecast and statistical measurement, because they are psychological rather than economic.

COURSE OF NEW YORK STOCK EXCHANGE QUOTATIONS (FROM THE "FINANCIAL CHRONICLE").

Corporations.	Highest.		Lowest.		Percent- ages of Highest Prices.	Quota- tions.	Percentages of	
	Dates, 1907.	Quota- tions.	Dates, 1907.	Quota- tions.			Lowest Prices during Crisis.	Highest Prices in 1907.
TABLE A. Railroads:								
Tennessee	Jan. 8	141.4	Nov. 4	1103.5	73.2	115.6	111.7	81.8
Illinois Central	Jan. 3	172	Nov. 16	116	67.4	132.1	113.9	76.8
Chicago & North Western	" 10	205	Oct. 30	128	61.5	160.9	119.7	73.6
Chicago, Milwaukee & St. Paul	" 14	167.5	Nov. 21	83.5	59.4	115.8	123.8	73.5
Great Northern preferred	" 2	189.7	Oct. 30	107.5	54.7	123.5	114.9	65.1
Northern Pacific	" 7	189.5	" 24	100.5	53.0	127.5	126.8	67.3
Southern Pacific preferred	" 14	118.1	" 24	100	84.7	110.5	110.5	93.6
Union Pacific	" 5	183	" 24	100	54.6	125.2	125.2	68.4
Totals		1,356.2		847	62.5	1,001.1	118.2	73.8
TABLE B. Industrials:								
American Telephone & Telegraph	Jan. 4	133	Oct. 30	88	64.2	109.5	124.4	82.3
General Electric	Jan. 27	163	" 23	89.6	54.9	121.5	135.8	74.5
United States Steel common	" 7	80.4	Nov. 23	21.9	43.5	29.6	135.1	58.7
United States Steel preferred	" 7	107.7	Nov. 20	78.1	73.4	94	118.3	87.3
American Smelting & Refining preferred	Feb. 15	117.4	Oct. 18	81.8	65.7	93.5	114.3	79.6
Caltumet and Hecla (Boston quotations)	Jan. 15	1,000	" 24	535	53.5	675	126.2	67.5
American Sugar Refining preferred	Jan. 16	131	Nov. 27	76.5	80.9	111	104.7	84.7
Swift & Co. (Chicago quotations)		113.5	" 4		66.5	97.7	129.4	86.1
Totals		1,816		1,076.8	59.3	1,331.8	123.7	73.3

TEN YEARS OF THE INDETERMINATE SENTENCE.

BY AMOS W. BUTLER, SECRETARY, BOARD OF STATE CHARITIES OF INDIANA.

Ten years ago last April Indiana enacted the indeterminate sentence and parole laws. The same legislature converted the State Prison South at Jeffersonville into the Indiana Reformatory and named the prison at Michigan City the Indiana State Prison. These laws applied to both institutions, and were afterwards extended to apply to the Indiana Woman's Prison at Indianapolis.

In 1898 the indeterminate sentence and parole laws were attacked in the courts as unconstitutional, but were upheld by the Supreme Court of the State. This has been the decision of the courts of last resort in all the other States in which a similar question had been raised except Michigan. In that State the laws were held to be unconstitutional, but the constitution of the State was later amended and the laws were re-enacted.

There was considerable opposition to these laws in Indiana. Most of our people were uninformed concerning them. They have been so wisely administered by the authorities charged with that responsible duty, however, that those who have become acquainted with their operations are now generally favorable to them. When one compares the old prison system with the new, the advantage to the State and the far greater benefit to the prisoners from the operation of these laws, who can say they are not a distinct gain for the Commonwealth?

The Governor of Indiana, J. Frank Hanly, has made an interesting admission regarding his attitude toward the indeterminate sentence law. As a lawyer, he was opposed to it. He thought it a mistake. When he entered upon his duties as governor, he was prejudiced against it, and intended to attack it when opportunity offered. His new office brought him into close contact with both the parole boards and the prisoners, and gave him an excellent opportunity to study the administration of the law and the results obtained. His complete conversion followed. As he himself has put it: "My past prejudices are broken down. Instead of its critic, I have become its defender. I have been convinced by what I have seen and heard and learned." This he declared publicly at the Indiana State Conference of Charities at Muncie, Oct. 7, 1906, and at the meeting of the National Prison Association at Chicago, Sept. 16, 1907.

Nor is Governor Hanly alone in his conversion. At the beginning the lawyers generally regarded the laws unfavorably. Gradually they have changed their views, and when a committee of the Indiana State Bar Association, appointed a year ago to study this question, presented a favorable report at the Association's meeting in Indianapolis in July, 1907, the report was received without adverse criticism.

During the past year an attempt has been made to learn how these laws are regarded from another standpoint. Letters were addressed to a number of paroled men and to their employers, requesting their candid opinion. The result was gratifying. While a number of employers had found the paroled prisoners unsatisfactory workmen, the majority expressed themselves as well satisfied, and many declared emphatically their belief in the value of the laws. Equally pleasing were the answers received from the men. The prevailing idea seems to have been expressed by one who wrote: "I think the indeterminate sentence law a much better law both for the unfortunate boy and the citizens of the State. It gives the first offender a chance to retrace his steps before it is too late."

These laws give the prison authorities an opportunity to release men who are deemed capable of becoming law-abiding citizens, and to retain for a longer period those who have not shown satisfactory evidence of reformation. In actual practice this has resulted in considerably lengthening the average time of service in prison. A study of the records of the State Prison has brought out the fact that the last three hundred men received under the old definite form of sentence served an average of 1 year, 9 months, and 14 days. The first three hundred received under the indeterminate sentence law served an average of 3 years, 2 months, and 12 days, or 1 year, 4 months, and 28 days longer. A similar study of the Reformatory records discloses an average sentence of 1 year, 8 months, and 22 days under the old law, 2 years, 4 months, and 6 days, or 7 months and 14 days longer, under the new. When it is understood that this increase is due largely to the longer time served by men convicted of such crimes as incest and rape, the figures have an added significance.

Most of us do not realize that there have been released in Indiana upon parole, after much training, from both the Reformatory and State Prison, 3,745 men in the past ten years. Of these but 25 per cent. proved to be unsatisfactory. Most of these paroled men were unemployed when their offences were committed. They had generally not been regular wage-earners. Hence it is interesting to learn that during the time they have been tested on parole they have earned for themselves \$949,773.31.

The following figures show some of the results of the operation of these laws from the time they went into effect, April 1, 1897, to April 1, 1907:—

	State Prison.	Reformatory.	Total.
Total number paroled	1,402	2,343	3,745
Received final discharge	831	1,253	2,084
Time expired while on parole	92	201	298
Returned for violation of parole	218	325	543
Delinquent and at large	114	309	423
Died on parole	29	48	77
At present reporting	118	207	325
Percentage of unsatisfactory cases	23.6	27.1	25.8

	State Prison.	Reformatory.	Total.
Total earnings of the paroled men	\$380,771.49	\$569,001.82	\$949,773.31
Their expenses	275,964.18	486,463.50	762,427.68
Balance	\$104,807.31	\$82,538.32	\$187,345.63

In Indiana now the indeterminate sentence law applies to all her prisons,—the Reformatory, the State Prison for men and the Woman's Prison. Minors are released from the reform schools (the Indiana Boys' School and the Indiana Girls' School) upon parole. Probation laws apply to both adults and minors. The juvenile court law applies throughout the entire State.

COMMUNICATION.

NEW YORK, Feb. 14, 1908.

TO THE COMMITTEE ON PUBLICATION OF THE AMERICAN STATISTICAL ASSOCIATION:

Gentlemen,—In sending out reprints of the June number of the Publications of your Association, the New York Committee on Physical Welfare of School Children is enclosing a slip of errata and addenda. We assume that you will not wish to call attention to typographical errors, most of which were fortunately so manifest as not to mislead. We hope, however, you will agree with us that it is worth while to give members of the Association, as well as the general reader, a brief summary of the criticisms received by us relative to the Report.

The most serious criticism referred to the first two of the twenty significant facts (p. 296).

1. *The statement that, if New York school children are typical of school children in the United States, there must be 12,000,000 such children having physical defects more or less serious, is not based on the Committee's study of 1,400 children.*

This criticism we must admit. We should have indicated that this finding was based on the records of the Board of Health which showed that, out of 165,000 children examined, two-thirds had physical defects. If this proportion should be maintained, the number of children in the United States having physical defects would be 12,000,000.

2. *The statement that, if the 1,400 children studied are representative of children in New York City and the United States, there must be in New York City 41,600 suffering from malnutrition, 182,000 from enlarged glands, etc., etc., is misleading.*

We admit that it would have been better to indicate clearly, what we supposed would have been evident, that this was a comparison between defectives intended only to indicate the ratios between such defects.

We recognize the danger of dogmatic statements regarding 18,000,000 children based upon the examination of 165,000 by the New York Board of Health and investigation of the home conditions of 1,400 school children. Nevertheless, as it was the aim of the Committee to call attention to the importance of the physical care of school children, as the records of the Board of Health showed that two-thirds of all children examined had physical defects, and as investigations made by the Committee into the home conditions of 1,400 school children proved that physical defects

were not confined to children of marginal incomes, it seemed permissible by the most rigid requirements of statistical methods to emphasize the extent of physical defects by the method here adopted.

The hypothetical character of the estimates was indicated by beginning the two propositions with "if," but it would have been better to place them under a more appropriate heading. Those who are sincerely interested in the problem, however, will recognize that these estimates, whether literally correct or not, point to a significant fact for the more accurate definition of which no other data exist than those we have presented. Even if 12,000,000 should ultimately prove to be an overestimate, the emphasis which it places upon the importance of physical examination and care of school children in all parts of the nation will hardly be regarded as extravagant.

Other criticisms, with the Committee's comments on them, are as follows:—

3. *The tables contain much material the meaning of which is not presented editorially.*

This we recognized when the Report was published. It was felt, however, worth while for future use by students to present all of the material. The Committee's first purpose was to throw light on a practical programme for school hygiene, and not to make a statistical study. Our tabulation and comparison stop with those facts that bear upon the question: Shall physical defects be corrected by school meals and free eyeglasses, or by physical examination at school and treatment of causal conditions at home, on the street, and at school?

4. *The practical conclusions contain matter not directly related to the tables.*

The Committee stated specifically (p. 300) that in formulating its conclusions it relied not only on the tables, but upon the Committee's experience of the past year, which included the study of literature bearing upon the subject, frequent conferences with physicians, school officials, social workers, etc.

5. *Mr. John Spargo's attitude toward free meals was misrepresented.*

We are informed that Mr. Spargo regards school meals as merely a makeshift; that he would have them free only for those unable to pay; and that he strongly urges a comprehensive programme for the study of home and school conditions that cause or aggravate physical defects.

6. *"Paying over 25 per cent. rent" should not be included under "unfavorable housing conditions."*

So far as present knowledge permits judgment, social workers and philanthropists are proceeding on the assumption that the paying of over one-quarter of the income for rent may reduce the amount available for

food, clothing, and heat, with more immediate injurious results than even a dark room or absence of bath.

7. *Income groups \$10-\$15, \$16-\$19 are not so fair for purposes of comparison as would be \$10-\$14 and \$15-\$19.*

The only use made of these income groups is to point out that physical defects are found among all of them, and that defective home environment is common to all. No attempt is made to compare group with group except in a summary table (XXXVII.), which we printed merely for the purpose of laying all the facts before students who might wish to compare group with group. Table XXV. gives the units upon which Table XXXVII. is based.

8. *Income units vary, being one dollar for incomes under \$10; two dollars for incomes over \$10 and under \$40; five dollars for incomes over \$40 and under \$50; twenty-five dollars for incomes over \$50 and under \$100.*

These divisions were made because they best served the purpose of the Committee's study. No practical and no statistical purpose could be served by reporting incomes by dollar units where the weekly return is over forty dollars. There was no way of knowing in advance that important differences would not show between the \$5 and the \$6 group, or between the \$10 and \$11 groups. The \$1 unit was used for all cards up to \$25. In tabulating, it was seen that no useful purpose would be served by separating \$11 from \$10 and \$13 from \$12. The only reason that Table XXV. giving the two groups was published was to make available material for later statistical inquiry.

9. *The term "per cent. distribution" in Table XXXVII. is not clear.*

This we regret. While our 20 significant facts and 15 practical conclusions were intended to show that physical defects were common to all income groups, and that, therefore, remedies must reach causal conditions among all income groups, we realize that, given equal care, children of lowest income groups are more likely to have physical defects and home handicaps than children of adequate income groups. 100 seemed the best common denominator available. We therefore set up a consolidated comparative table that would show whether or not the proportion of defects and unfavorable conditions was higher or lower in a given income group than its proportion to total families. By failing to separate from the general table the two summary columns \$10 to \$19 and \$20 to \$29, and by failing to set up a final 100 per cent. column, by which to check additions of the six income groups, we failed to make the most out of this table. Nevertheless, the table brings out certain significant facts. For instance, it shows that, while among 1,400 families visited only 8.4 per cent. had weekly incomes less than \$10, this same small group con-

tained 13.8 per cent. of the malnutrition, 9.6 per cent. of the defective breathing, 10.3 per cent. of the families losing children, and 8.6 per cent. of those paying over 25 per cent. of their income for rent. It is also interesting and suggestive to note that, while families having an income of over \$30 a week are but 15.6 per cent. of the total families, they include 27.6 per cent. of those who pay over 25 per cent. of their income for rent.

Permit us to express our appreciation of the service rendered by the American Statistical Association in presenting at a time of growing public interest in school hygiene this study of the home conditions of school children suffering from physical defects.

COMMITTEE ON PHYSICAL WELFARE OF SCHOOL CHILDREN.

NOTES AND REVIEWS.

NOTE ON PROPOSED RULES OF STATISTICAL PRACTICE.

The last issue of the Publications contained (page 523) some proposed resolutions relating to the practical collection and compilation of vital statistics, the purpose and scope of which may not be entirely clear without some knowledge of the character and organization of the body to which they were presented; namely, the newly organized Section on Vital Statistics of the American Public Health Association.

As indicated in the Publications, the proposed rules formed an Appendix (Appendix C) of a paper, from which is extracted the following explanatory statement:—

Third, and last, of our most pressing general requirements would seem to be the establishment of uniform Rules of Statistical Practice, which should be carefully formulated, supported by evidence of their necessity, carefully considered by the special committees of reference and by the registration offices which are to carry them out, and when finally *adopted* under the auspices of this Section and of the American Public Health Association, *then they should be strictly complied with* by all of the registration offices of the United States. Otherwise, practical uniformity and comparability of vital statistics will be quite out of the question. Every safeguard should be employed against hasty or ill-considered judgment, but, once settled, a Rule of Statistical Practice should govern absolutely until repealed. As examples of some questions on which we should legislate, some proposed resolutions are submitted (Appendix C) on the following subjects:—

1. Statement of cause of death.
2. Statement of occupation.
3. Statistical definition of deaths.
4. Statistical definition of stillbirths.
5. Statistical definition of births.
6. Essential requirements for registration of deaths (reindorsement).
7. Essential requirements for registration of births.
8. Method of testing accuracy of registration of deaths.
9. Method of testing accuracy of registration of births.
10. Constitution of standard tables of vital statistics.
11. Adoption of uniform age-periods in mortality statistics.

These proposed rules, together with those that may be suggested by other members of this Section, will probably afford sufficient material for committee work during the ensuing year. By keeping an accurate record of the decisions upon all propositions, whether *pro* or *con*, we shall

soon have a valuable code of statistical procedure to guide our action, and will know as well what has not been approved and so avoid statistical byways leading to confusion.

The resolutions are now under consideration by the various committees of the Section on Vital Statistics, and their recommendations for action in regard to some or all of the propositions may be submitted at the next annual meeting of the Association at Winnipeg, Manitoba, August,* 1908. Suggestions or recommendation relating to the subjects covered, or to other matters of statistical practice, will be warmly welcomed from members of the American Statistical Association and from all others interested. They may be sent to Dr. Wilmer R. Batt, State Registrar, Harrisburg, Pa., who is Secretary of the Section on Vital Statistics, and who will refer them to the appropriate committees.

CRESSY L. WILBUR.

MUNICIPAL STATISTICS.

Statistical Summary of the City of Buenos Ayres. By Albert B. Martinez, Director of Municipal Statistics, 1906.

This report is the sixteenth of its kind, the bureau of municipal statistics of Buenos Ayres having been established in 1881 by Dr. Emilio R. Coni. The present volume contains an introduction of 55 pages and the main part of the work 352 pages. The introductory part is of value to all students of vital statistics, as it contains up-to-date international comparisons of birth, marriage, and death rates. These latter distinguish the mortality of children under one year of age. There is also an international comparison of eleven infectious-contagious and other causes of death on the basis of ratios of the specified causes to all causes.

Some of the facts presented in the statistical summaries are of quite exceptional interest, and are seldom, if ever, found in the municipal reports of the cities of the United States. Under climatology, the barometric pressures; temperature and relative humidity; and the psychrometer readings, dry and moist, are given for three daily readings,—7 A.M., 2 P.M., and 9 P.M.,—the averages being given for every ten days or as nearly as this is possible, to give three averages for each month. The rainfall and average velocity of winds are also given for the thirty-six divisions of the year. The heliometric observations are presented for each month, and include the hours that the sun was above the horizon, the hours that it was visible in the morning and in the afternoon, and the number of cloudy hours. The atmosphere is chemically analyzed for ozone, during the day and during the night, for carbonic acid, and for organic ammonia. Finally,

* The exact date of the meeting is not yet determined.

the air is bacteriologically analyzed for bacteria and what is called "mustiness." The results of the chemical analyses are averaged by months, but the bacteriological results are expressed in periods of from three to eight days' duration of bacteria growths from samples of air taken near the first and middle of each month.

Of other more or less unique statistics, mention may be made of the statistics of race tracks, or, as they are locally called, "hippodromes." These tables show, among other facts, the amount of money wagered on the horses. They show that race-track gambling has rapidly increased in Buenos Ayres, and during 1906 over \$49,000,000 was wagered at the "hippodromes," or an average of nearly \$50 per capita for the city's total population. Theatre statistics, financial statistics of the National Charitable Lottery, strike statistics, and returns of the Sick Fund Societies are included in other tables of more than local interest.

Under the heading "demography" there are some valuable statistics of births, marriages, and deaths. Births are returned as legitimate, illegitimate, and still-born, though the latter are not considered true births. Twin and triplet births are separately tabulated, as are also the illegitimate births legitimized by declaration of one or both parents. The legitimate children are classified by nationality of mothers and order of birth. This table shows, for example, that in 1906 two Italian mothers gave birth to the twentieth child. The order of birth is also tabulated by ages of the mothers. In 1906 there were 1,996 children born of mothers under twenty years of age and five children born of mothers over fifty years of age. Of the former number, 1,467 were first births, 424 second, 74 third, 4 fourth, 4 fifth, and 2 sixth; while of the latter one was a second child, one a sixth, one a seventh, one an eighth, and one a twelfth.

The marriage statistics are given in less detail than the births, and are principally interesting because of the ages. The most popular age for marriage is under twenty for girls. About one-third of the young men marry at ages 21-25 and another third at ages 26-30.

The mortality statistics occupy thirty-eight pages of the volume, and the tabulations are in many respects admirable. The crude death-rate of Buenos Ayres has declined from 27.2 per 1,000 in 1888 to 16.5 in 1906. The rate was highest (30.0) in 1890 and lowest (15.5) in 1905. Tuberculosis seems to have been somewhat more fatal to the native Argentines than to persons from outside of the Republic. During 1902-06, among those of Argentine birth of ages fifteen and over, 28.5 per cent. of the deaths from all causes were from tuberculosis as against only 14.3 per cent. for persons from outside of the Republic.

The mortality of children is an important subject admirably treated in these statistics of Buenos Ayres. Although the divisional periods of life at ages under five are not given in the detail available in the statistics of

Berlin, Germany, where they are given for single months for the first two years of life, they are better than are to be found in most of our American cities. The age periods for deaths under five years of age are: 1 to 30 days, 1 to 6 months, 6 to 12 months, 1 to 2 years, 2 to 3 years, 3 to 4 years, and 4 to 5 years.

The death rates per 1,000 born and surviving are calculated by single years of life per ages 0-4 for each of the seventeen years 1890-1906. The following condensed comparisons indicate a notable improvement in the mortality of children in Buenos Ayres during that period:—

DEATH-RATES OF CHILDREN PER 1,000 BORN AND SURVIVING, BUENOS AYRES, 1890-1906.

Ages (years).	1890.	1895.	1900.	1906.
0-1	176.9	132.5	123.5	102.3
1-2	92.3	84.1	61.8	40.4
2-3	54.9	41.7	25.5	17.2
3-4	45.4	34.8	20.9	10.4
4-5	43.0	23.3	13.3	6.0

The following table shows the death-rates per 1,000 of those born and surviving under two years of age for certain causes and per 1,000 of those born and surviving under one year of age for three causes:—

DEATH-RATES OF CHILDREN PER 1,000 BORN AND SURVIVING, BUENOS AYRES.

Causes of Death.	Ages under two years.			
	1890.	1895.	1900.	1906.
Diphtheria and Croup	7.1	2.0	1.6	0.5
Whooping-cough	1.2	0.7	0.7	0.7
Tuberculosis	1.3	1.4	1.8	1.3
Meningitis	11.2	14.5	8.6	9.2
Diarrhoea	36.9	31.4	29.1	23.1
Respiratory Diseases	28.0	26.6	24.9	19.0
	Ages under one year.			
	1890.	1895.	1900.	1906.
Tetanus	12.4	8.4	8.4	2.8
Convulsions	4.3	3.8	2.1	1.6
Congenital Debility	17.2	12.0	12.5	9.5

These abbreviated tables indicate very clearly that the improvement in the infantile mortality in Buenos Ayres has been largely due to two factors,—better general care of children and better medical treatment.

A valuable summary table gives the death-rates per 10,000 of population from the principal causes of death for each of the twenty years 1887-1906. The heading to this table contains a curious error often met with in newspapers, magazines, and, strangely enough, even in official statistical publications. The heading reads as follows: "Total Deaths in the City, from Several Diseases, of the Last Twenty Years for Each 10,000 Inhabitants, showing Percentage of Each Disease." To say percentage per ten thousand, or, as is more frequent, percentage per thousand, is somewhat like saying that a train runs at a speed of sixty miles per hour per minute.

Suicides are considered in a chapter which treats of criminal statistics. It is worth noting that unsuccessful attempts at suicide are recorded as well as actual suicides. During the ten years 1897-1906 there were 1,316 suicides and 1,090 attempts at suicide. The suicides are tabulated by sex, age, cause, and means employed. About 70 per cent. of the suicides were males. Women committed suicide at earlier ages than men. Family troubles caused about one-fifth of the suicides, and physical diseases one-seventh. Fire-arms were the means employed in over 42 per cent. of the cases, and poisons in over 28 per cent.

Annual Report of the Health Department of Louisville, Ky., for the year ended Aug. 31, 1907.

The value of this report for any practical purpose—sanitary or other—is seriously impaired by the failure to separate the white and colored deaths, except in the aggregate. Approximately one-fifth, or 20 per cent., of the total population of Louisville is colored. The total population of the city is about 250,000, of which nearly 50,000 are negroes. The crude death-rate of the colored population during the year ended Aug. 31, 1907, was 23.3 per 1,000 of population against a rate of only 16.4 for the white population.

Consumption caused 490 deaths during the year, a larger number than was charged to any other specific cause. The report, however, does not indicate what proportion of these deaths occurred among the white and colored elements of the population. For comparative or other sanitary purposes it would seem to the writer that a clear and sharp distinction should always be made between the vital statistics of the white and colored populations of a city whenever or wherever the colored element forms as much as 10 per cent. of the total population. All the known facts indicate that the crude death-rates of negroes are about 50 per cent. in excess of the crude death-rate of the white populations in both the North and South. Further, it is a well-known fact that the excess of mortality among the negroes is principally

due to a few well-defined causes, of which consumption is one of the most prominent. Unless, therefore, the vital statistics of the two races are carefully distinguished, some of the most useful facts are lost sight of and some of the most valuable sanitary and health lessons are not taught by the health reports.

F. S. CRUM.

IMPROVEMENT OF VITAL STATISTICS.

Registration of Deaths. Including a paper on "The Essential Requirements of a Law for the Registration of Deaths and the Collection of Mortality Statistics," prepared by the Committee on Demography of the American Public Health Association. (Circular.) United States Census Office, No. 71, pp. 10.

Practical Registration Methods. Information for local registrars as to the standard certificate, forms of records, and indefinite causes of death reported by physicians. United States Census Office, 1903, No. 101, pp. 28.

Relation of Physicians to Mortality Statistics. The international classification of causes of death as adopted by the United States Census Office and approved by the American Public Health Association. United States Census Office, 1903, No. 102, pp. 26.

Registration of Births and Deaths. Drafts of laws and forms of certificates. Bureau of the Census, No. 104, pp. 31.

Statistical Treatment of Causes of Death. Co-operative work relative to treatment of jointly returned causes and the revision of the international classification. Bureau of the Census, No. 105, pp. 19.

Extension of the Registration Area for Births and Deaths. A practical example of co-operative census methods as applied to the State of Pennsylvania. Bureau of the Census, No. 106, pp. 51.

Modes of Statement of Cause of Death and Duration of Illness upon Certificates of Death. Comparison of forms now in use in the United States and certain other countries, and suggestions of a modification of the standard certificate of death in order to secure uniform and definite statements of causes of death. Check-list of registration officials, reports, and bulletins. Bureau of the Census, No. 107, pp. 81.

The first three of these pamphlets were issued by the Division of Vital Statistics under the direction of Mr. W. A. King, former chief statistician for vital statistics. The last four were more recently published under the direction of the present chief, Dr. Cressy L. Wilbur. Together they give abundant evidence of the vigorous efforts of the federal government

to improve the quality of the vital statistics of the United States. The Census Office at the present time does not make any independent effort to collect statistics of births and deaths. Its statistics are based upon the returns of local and State offices in the so-called registration area, and obviously its work is affected by the quality of local registration. One of the greatest defects is lack of uniformity of procedure in the several States, and it is the endeavor of the Census Office to remedy this defect. These pamphlets represent a campaign of education along this line, and give hopeful promise of great improvement in the future.

The last in this series, No. 107, is by far the most important. It includes an account of the methods of reporting causes of death and duration of illness in the United States. A copy is given of the standard certificate of death which is followed at the present time in eight States and in twenty-one cities outside of the given States. Copies are also given of "modified standard certificates of death." The practice of foreign countries is also detailed. Interesting comments are added on the terminology of terms employed on certificates of death to denote cause of death. Illustrations are also given showing the confusion which arises from the inexact use of "causes." This pamphlet closes with a check list of registration of officials and a record of the health bulletins issued by the several State and municipal offices.

THE LIMITATIONS OF STATISTICS.

William H. Allen, in his "Efficient Democracy," has written an Epistle to the Gentiles preaching a new gospel of the statistical method as a guide to life. He tells us that goodness is nothing without efficiency, and that efficiency finds its firm foundation in the statistical method. Just plain goodness is not enough: one must be "good for something," and this "something" is purely objective and may be counted, weighed, and tested; and efficiency develops goodness, as the time-clock and the cash register develop habits of punctuality and honesty.

And Dr. Allen, in the true evangelistic spirit, will not allow this way of holiness to remain the esoteric possession of a statistical priesthood. He goes forth to preach the statistical gospel to "every man." He tells us, indeed, that, like M. Jourdain in another field of human knowledge, we all have been more or less unconscious statisticians all our lives. We are told that, when we are conducting the ordinary operations of reasoning, we are statisticians; that the scientist reaches his result by "statistics"; that business method is practically the statistical method; and that the carpenter and plumber are quite as "statistical" as the political

scientist. It is not difficult to see the extravagance of these propositions; but we may perhaps forgive them, for they give the necessary heat and impetus that propel the apostle in his very useful social task of trying a big experiment for us.

Dr. Allen's book is not merely the exposition of an abstract theory, but a record of beginnings at least of the application of that theory in practice, along the lines of a great and vital need in modern communities. And, as such, the book is exceedingly valuable and stimulating. Whether we do or do not accept Dr. Allen's theory of the universal applicability of the statistical method, it is becoming increasingly plain that our affairs, in modern communities, are growing beyond our grasp or our means of dealing with them directly and personally. The statistical method is a means of dealing with such larger affairs; that is, its essence consists, in the case of numbers of instances too large to be grasped by the unassisted observation, in translating our individual qualitative judgments into quantitative terms, to reduce them again to the new qualitative judgment we are after. This method at best is a mechanical means, and gives us a nearer or farther approximation to the truth. It has its own limit and function, which any elementary text-book on statistics will indicate; but in the more complicated affairs of life we are compelled to have recourse to it. And, as the application of this method; is more or less sporadic at present, every new attempt that adds to our knowledge of its limitations and to the development of its capabilities is of the greatest social value.

Dr. Allen has had the great good fortune to be intimately concerned with one enterprise after another, undertaken with the object of shedding more light on dark places, and has had the great satisfaction of seeing one institutional skeleton after another rattle its dry bones with terror and the thrill of coming life. And, as at the time of writing the book most of the enterprises were in that cheerful early stage in which promise is greater than performance, the author's enthusiasm is not as yet dampened by the disappointments that will surely come, as experience reveals the limitations of his method.

The record of accomplishment so far, however, is a highly creditable one. More light has been turned on the hospitals, the organized systems of relief, and the complicated affairs of the municipality in its various aspects, as the schools, the parks, the care of the public health, and the administration of the public finances.

In the case of the New York City hospitals, for instance, a falling off of revenues and increase of debt having directed attention to their business management, it was found that the greatest disorder, obscurity, and actual lack of information characterized their records and reports, so that neither their managers nor the public knew either the cost or the

services rendered in return for cost of these enterprises. As a result of these discoveries, a schedule of uniform accounting and reporting was drawn up by a committee, adopted by the four leading hospitals of New York City in 1906, and endorsed in 1907 by a permanent hospital conference.

In the public schools, where great masses of heterogeneous human material are thrown upon the educational threshing-floor, and where the old rules fail, derived from small schools and a homogeneous, home-trained population, a record-card has been introduced, giving information as to the physical condition of each child. On the basis of this card one-sixth of the 600,000 school children of New York were examined, with results pointing clearly to definite needs in the school system. A private Committee on the Physical Welfare of School Children has been organized to carry the investigation farther into the home conditions, with a view to the improvement of these as well. Another help to the schools was the improved school census undertaken by New York City in 1906, of which Dr. Allen gives the schedule in his book.

Perhaps the most generally interesting of the various enterprises undertaken are those involving the application of the statistical method to public affairs. The duty of the citizen is one of those general duties that seems of indirect concern to the individual, yet is of the most direct concern. And yet, even when he is aroused to it, how helpless he feels in trying to cope with these mixed-up affairs so far out of reach! How many attempts at "reform" have failed because, as Dr. Allen well puts it, the leaders of public opinion have not realized that "publicity and reform have their technique as well as business and law"!

The transactions of the New York municipality, as of other municipalities, are recorded and reported in such a way that the average citizen cannot have any clear idea of what is going on,—whether his "good" appointees are really doing good work, whether his "bad" appointees are really as worthless as the campaign orator depicts them. The present comptroller of the city of New York has said that "the existing method of keeping the city's accounts serves only to conceal the facts." In his own office it had been the practice of the department to make up records for private title companies, while the city records on the same subject were years behind, so that, when the city required the information in question, it had to go to the title companies for it. Some one else said, in regard to the work of the city, "It is impossible to get information unless the seeker himself turns book-keeper."

To quote Dr. Allen on the situation: "An educational budget of \$25,000,000 is voted without school or fiscal authorities knowing what expenses were incurred the preceding year, the number of pupils that benefited, or the work contemplated for next year. There is a difference

of \$50,000,000 between the mayor's guess and the comptroller's guess as to the city's borrowing power not yet used. Department heads ask for 25 per cent. to 100 per cent. more than they need, estimates for unpopular purposes are shrunk, water is put in the requests for purposes favored by the fiscal board, and then later in the year the surplus in popular is transferred to unpopular purposes without due knowledge or consideration. Although this happens year after year and although reports might be made to show the fact, fiscal authorities go on voting without knowledge as to what actually became of moneys voted last year. Supplementary appropriations, like transfers, do not enter into budget-making. Imaginative assistants guess what the departments need, the board of estimate and apportionment guesses what they can do without. Reports are published too late to be read, *sans* units of inquiry, *sans* subtraction, *sans* percentages or classification. No one learns anything from them. No one would pretend to base method or policy upon them."

A "Bureau of City Betterment" made an effort toward bringing practical statistical help to the operations of government by presenting to the board of estimate a classified statement of the work of the Department of Health, as a basis for a budget. The immediate result was an increase of \$100,000 for school inspection, a health budget showing work planned, with its funds segregated to insure the execution of the plan, and instructions by the board of estimate to all departments to submit budgets for 1908 in such shape as to show the work done in 1907 and the work contemplated for 1908.

In continuation of this story the New York *Times* for Oct. 3, 1907, states that "Mayor McClellan, Mr. Metz, and the other gentlemen who preside over the apportionment of the city budget were gratified by the exceptionally clear estimates of the future needs of the Board of Health furnished yesterday by Dr. Darlington. They were so described and so detailed that the board could consider them intelligently and the tax-payers would know what they were expending their money for. The credit for this striking achievement belongs not only to the head of the Health Board, but to the Conference Committee of Comptroller Metz's department and to the Bureau of Municipal Research, whose recommendations Dr. Darlington adopted."

The Bureau of Municipal Research above referred to is perhaps the most interesting and important recent realization of the application of statistics to life. This is an outgrowth of the "Bureau of City Betterment" of the Citizens' Union, but quite independent of any political organization for obvious reasons, to secure greater effectiveness. The work of such a bureau was already outlined in Dr. Allen's book before the bureau itself was established. As there outlined, it would deal with

such matters as the analysis of annual budgets, examination of departmental reports from the standpoint of the tax-payers' interest in the accomplishment of results, critical study of the finance department's attempts to give publicity, scientific study of the framework of the city government, as, for instance, in charter provisions, organization of departments and methods of control, minute analysis of facts regarding different departments, organization, expense, results obtained and methods of presenting results—education, health, parks, docks, board of aldermen, borough president, board of estimate, comptroller's office, mayor's office; examination of facts regarding the city debt and franchises; extent and cause of remediable conditions that indicate governmental responsibility for the physical deterioration of children, for pauperism, for crime, for preventable disease, etc.

It is perhaps a mark of the apostle that Dr. Allen seems to think not only that his statistical gospel is needed by every man, but that it is brand-new; that is, in conscious acceptance. And so he seemed to regard this bureau as a somewhat unique enterprise. He certainly says definitely (p. ix.) that "at present there is *no* mechanism for learning and publishing the facts of social life and public administration." He seems to have forgotten for the time being such institutions as the Federal Census, with its various detailed investigations; or the Boston Department of Statistics, founded to do a work similar to that of the New York Bureau or the National Municipal League, which has interested itself especially in municipal accounting and recommended a scheme which has been approved and utilized by the Federal Census Bureau and by upwards of eighty cities.

But it may perhaps be said that the New York Bureau is trying the experiment of statistical research as a direct aid to governmental efficiency on a larger scale and under more favorable circumstances than it has been tried before, and from it most valuable results are sure to be gained, in experience of limitations as well as in positive achievement. Indeed, if Dr. Allen will write us another book at the end of ten years, telling us fully and frankly the outcome of the various experiments of that bureau and the other enterprises undertaken along the lines indicated in the first book, we shall have a couple of volumes forming a noteworthy contribution to the literature of statistics.

Is it too early to forecast some of the results of that and similar experiences? In the first place, the present rage for putting every conceivable thing in the shape of "statistics" and beginning every enterprise of any sort whatever with a long and elaborate and costly research will probably have subsided. Just now much of what is produced as "statistics" appears a laborious attempt to prove, by figures, what was sufficiently well known before to any one with a fair amount of common

sense. Is there typhoid fever in Pittsburg? There is no need of elaborate statistical apparatus to point out the evil and the remedy. There is no occasion for showing in detail the cost to the community through the families afflicted,—their wages, rents, household budgets, ancestry, or what not. The evil is seen in ten minutes' scrutiny of the bare record of cases and deaths: the remedy is abundantly known to every physician and every intelligent layman. What is needed in such cases is not a Galileo, but a Peter the Hermit.

Great practical difficulties are certain to arise in the application of the statistical method, even where the great complication of affairs makes it necessary, to miscellaneous masses of concrete fact. Dr. Allen lays proper emphasis on the necessity of finding a countable unit, but he altogether too cheerfully assumes that for every intelligent question there can be found "a statistical answer" (p. 27-28). It would be difficult, we think, to find the unit for a large proportion of the questions Dr. Allen himself asks in the long lists shown in his book. And even the sample schedules given by him show more than one question to be answered by "bad" or "good," or some other term not verifiable by an objective, definite standard. The results of the physical examination of school children, for example, have already been made use of by agitators, on the basis of such ambiguous terms as "need" of medical or surgical attention, "bad" digestion, "mal"-nutrition.

Another practical difficulty will be in securing original records which will show the units desired. This is at the bottom of half the trouble about adequate statistics, that no daily record has been kept of things we want to know. And it is difficult, even where there is a desire to do this, to anticipate the questions likely to be asked. The point of emphasis of interest changes from period to period: the daily record may be changed to answer the questions asked at a given date only to find that within a year other questions are being asked and the old questions are no longer heard. As comparison gives nine-tenths of their value to statistics, it is often necessary to choose between an old, inadequate basis of classification, allowing of comparison, and a new system, adequate for the moment, without that base of comparison.

Another practical difficulty is in the expense and effort involved. It is all very well to say that \$500 is well spent in saving \$1,000, but in practical statistical work it often happens that a scheme of great theoretical value in throwing light and saving cost will itself involve so much greater cost as to be impossible.

Furthermore, it has to be again recalled that the statistical aid is, after all, purely mechanical. Its usefulness depends very largely upon the "goodness" Mr. Allen puts in the background and upon intelligence in interpretation that is not always available. Any one who has worked

in statistical enterprises can readily furnish examples of this. Indeed, Mr. Allen's simple illustration of the value of statistical method affords an equally vivid illustration of its defect. Efficiency does promote goodness just about as the time-clock and cash-register promote punctuality and honesty. Any one who has ever managed an office knows that the perfunctory punctuality and honesty inculcated by the above-named devices are a poor excuse for the real thing; that the inert employee will remain inert under these checks and safeguards, and the actively ill-disposed will find ways to "beat" the machine. Yet the machine is, after all, better than nothing.

Thus with statistics. In a certain city department a commissioner was desirous of making a better record than his predecessor. In the statistical report of the department the number of orders issued was made a leading feature—on its face, a reasonable enough unit. The commissioner in question, by giving instructions to prepare the orders differently, made three out of the same material which had formerly made one, and showed a tremendously increased volume of work. Another plan resorted to was to issue orders as a result of perfunctory and worthless inspections. This also increased the volume of work done, and in this case there was no means of testing the quality. In the former case there was a means, as another tabulation of orders, on the basis of separate items attended to, showed the fallacy. But nine people out of ten, reading the report, would have failed to note the discrepancy.

This attempt to seize quality in the quantitative net is always imperfect, even under the best of circumstances. In the department referred to, units of work are necessarily employed to keep the inspectors up to a standard. Here, again, it is possible for an inspector to make good his required points by not doing his work thoroughly. There is a perpetual dispute going on between those who think the number should be so low as to permit of thorough work and those who think the number of units is of the most importance. Of course, a tendency to slight in quality of work is detected sooner or later by supervisors sent over the ground to test this. And this is not to say that cash-register methods are not necessary, but that they are cumbersome and mechanical at the best.

There are also the hindrances that arise when one set of people is trying to throw light upon and get light from another set of people. Dr. Allen has well summarized the main reasons why the production of intelligence has not been undertaken by the governing officials of large enterprises, public and private: first, fact is subordinated to expediency; second, in public life officials have been chosen for service to party rather than for fitness, or perhaps good men have been placed in office to carry out a program that a knowledge of actual conditions would have shown in

advance to be impracticable; third, officers are changed too often to discover needs and devise remedies or to develop a continuous policy.

And, lastly, it will always be difficult to get the public to use even the clearest and most carefully prepared information. For obvious psychological reasons the question, "Has any money been stolen?" will always be more vitally interesting than "Are we getting our money's worth?" After all "goodness" and "badness"—the absolute—is what takes the public eye, not the how much or how many. Nevertheless, the statistical method is the necessary machinery of the future. Like that other method of dealing with matters in gross,—the factory system,—it will never supersede the method of dealing at first hand with the concrete things, and may often follow very clumsily after; but it is necessary to supply the clamoring need of the world, which can no longer be supplied by individual effort.

KATE HOLLADAY CLAGHORN.

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PROBLEMS OF SOCIAL STATISTICS AND SOCIAL RESEARCH.*

BY FREDERICK L. HOFFMAN.

Problems of social research require for their practical solution an adequate and conclusive basis of data free from even the suspicion of bias in their collection or serious error in their analysis. The ever-increasing complexity of social relations demands a clear presentation of social facts and forces, which, unfortunately, is only too often wanting as an underlying basis for plans and purposes of social reform. The collection of social statistics is almost invariably a most difficult and complex task, involving what may often amount to impertinence in a scientific inquiry into the actual facts of domestic life and the more or less successful individual adaptation to conditions as they are. This, for illustration, is best made evident in the numerous efforts to collect data as to household expenditures among wage-earners and others, but with patience and skill some, at least, of these investigations have produced conclusive and very valuable results. The value of investigation into social conditions is increased in proportion as the field is limited and as the investigator brings personal qualifications of an exceptional character to bear upon the collection of the data required. Those who are most familiar with the life and labor of the wage-earner, the poor and the pauper class, are, by their knowledge and experience, the best qualified to secure the original data upon many of the most important questions

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which demand solution. Unfortunately, it is difficult to secure qualified investigators, whose judgment has not become impaired by repeated impressions of social misery resulting from circumstances or conditions which may have no connection whatever with the problems under consideration. The object in view being strictly a scientific one, every effort should be made to eliminate sentimental bias or prejudice strongly inclined towards unwarranted conclusions or an unwarranted interpretation of the facts collected. Nowhere is the risk of amateur work greater than in the field of social statistics and social research, and, *per contra*, nowhere is the necessity of exceptional ability and discriminating judgment greater than in this. In economic statistics, such as prices and wages, cost of production and hours of labor, errors of judgment are less likely to occur, in that the degree of variety in the units to be considered is much less. Such data also are much less elusive in character, and not so complex in their relation to other and still more involved problems.

In its finality social research, as the term is generally understood, may be said to have for its object the solution of the problem of poverty, with all its resulting problems. Such social investigations, therefore, are largely concerned with an inquiry into the actual circumstances of life on the part of the poor and the relation of their condition to the wealth and circumstances of the materially more fortunate, or the well-to-do and the rich. The question which is being asked with ever-increasing frequency is whether, under modern conditions, it is necessary that there should be as large a proportion of the poor and pauper class as are actually met with in civilized countries. Social inquiries are being directed to ascertain whether poverty, pauperism, ignorance, and crime are not more the result of an accidental miscarriage of human effort than of inherent limitations of human society as it is organized. Those who have felt most strongly upon the subject of social misery have elaborated in detail plans of radical social reform, but the many ideal communities which have been established have all been more or less complete failures. There are those who deny that

social progress is actually being made and who, in the words of Henry George, believe that "the poor are growing poorer, and the rich are growing richer." Theories are being spread broadcast over the earth as to the ever-increasing duties of the rich, the well-to-do, and even the prosperous towards those who are living under less fortunate material circumstances and conditions. In the abstract it is a question of social justice of one group of human beings towards the other, and it must be admitted that within the last generation, at least, a sense of social responsibility has been developed which was unknown in earlier and even comparatively recent times. The evidence is overwhelming that much of what goes under the term of social legislation has been productive of decidedly beneficial results, having improved the conditions of life generally and eliminated, among others, the needless evil of child labor and of degrading work on the part of women formerly employed in many industries unsuitable to the sex and certain to produce physical and moral deterioration. Much good has also been accomplished by social legislation relating to factory inspection, hours of labor, employers' liability, etc., all of which warrants the conclusion that even greater results may be attained by still more effective legislation or associated effort for the benefit of the mass of mankind not in a position to help itself.

As an aid toward the solution of these problems, social statistics are indispensable, and it may be said without fear of contradiction that much of the miscarriage of effort in social legislation has been the result of misleading statistics and even more of misleading analysis, little short of amateur guesswork. By slow degrees the inadequacy of the present basis of fact along certain lines of social legislation has been recognized, and efforts are being made in every direction to make such investigations more qualified, trustworthy, and practically useful. The time has passed when a plain statement of absolute fact relating to social conditions possible of amelioration or change could go unchallenged or leave a problem unsolved, merely as a matter of complacency, indifference, or criminal neglect. The present age demands the truth, and, when the truth has

been secured, it is willing to take action and institute reforms at whatever cost, provided the result is for the distinct and unquestionable benefit of the mass of mankind.

There is an essential difference which marks and limits the field of social statistics, and that is that the most important data have to be secured by private enterprise for a large variety of purposes, while economic statistics are properly a matter of government concern. There is a natural and proper limit upon government inquiries into the facts of every-day life and labor, as made evident by the great difficulty of the Census Office to secure data as to sickness and infirmity among different classes, while still more delicate investigations, such as, for illustration, the sanitary condition of homes, the physical condition of children, the degree of frequency of periodical savings, and the expenditures for drink, are evidence that private enterprise can do the most efficient work in this field of scientific research. But another difficulty in such investigations is that the trained investigator is rare, and it is only too often an amateur who takes up such work as a sort of plaything for an idle hour. Yet of all the delicate tasks to which the human mind may apply itself the collection of social facts and the study of collective social phenomena are the most difficult, but at the same time the most valuable.

Social research, in a limited sense, has for its chief concern a qualified inquiry into the underlying causes of poverty and economic dependence on the part of a disproportionately large number of wage-earners and others constituting the mass of mankind in all civilized countries. Since the beginning of time the weak and dependent have been compelled to rely upon the strong and more fortunate, and to the end of time, in the nature of things, this must needs be so. But in a free democracy it is a political as well as a social duty, by majority rule, to bring about, through an intelligent co-operation in State and associated effort, a condition of things most favorable to the highest development of social units and efficiency in citizenship and social relations. Blind faith is often placed in law and legislation to bring about reforms which, in too many cases, can only

result from slow changes in human character, in economic conditions and industrial methods, and, the more clearly this is understood, the better for those whose interests are at stake. As an aid in the solution of social problems, human benevolence is called into action as a Christian charity and duty, but in its aims and purposes it stands in much the same relation to human society as the medical man does to the patient suffering from incurable ills,—it may relieve, and does relieve, much suffering and hardship, but it no more removes the cause of social ill-health than the physician removes the cause of disease by the more or less effective cure of the suffering patient. Many years ago the result of this theory of social reform through the efforts of benevolence alone was summed up in the following brief statement, which is well deserving of being repeated on this occasion :—

On every hand he [the tender-hearted man of good means and substance sees the most glaring anomalies in society; immense wealth and gigantic poverty; the highest points of civilization and the lowest depths of barbarism; men and women living in possession of an overflowing abundance of the elegancies and comforts of existence, while in the same city those of like passions with themselves, members of the same great human family, are herding together not so much like savages as like wild beasts,—in short, a state of things rising on one side as near to heaven as on the other it sinks near to hell. His conscience gives him no rest till he has done something by way of remedy; so he subscribes to some charitable institution, writes a pamphlet, or forms a philanthropic society. He labors for a time: tries various schemes for man's regeneration; opens a school perhaps, or a soup-kitchen, or promotes emigration; and ultimately finds himself so much imposed on and deluded by the very people whom he is laboring to serve, that he gives up the profession of philanthropy, and returns to enjoy the good things of this life without feeling as previously that "the trail of the serpent is over them all."

And in continuation, speaking of this class of persons,—

Seeing nothing but distress, their relief of it is direct and prompt, and necessarily temporary. The causes of distress are left untouched, and constantly reproduce cases of the same kind; and these benevolent gentlemen cannot be induced to adopt the slow and apparently harsher, but in

reality more merciful plan, of patiently investigating causes and removing them if they are removable.*

In this same sense I would define the objects of social research; that is, to ascertain with absolute impartiality the causes conducive to social ill-health, chiefly poverty and economic dependence, and, after having ascertained the true and real causes, to suggest a rational and practical method of social reform, in conformity to the same exact scientific principles which govern in investigations in applied chemistry or economic geology. Poverty and want are such closely related terms that every age attaches to them new and different meanings, but it may safely be asserted that needless poverty at any time is that which inflicts upon the many such burdens as substantially hinder them in the struggle for the maintenance of the highest possible rational standard of life. It is not so much a question of suffering as of a needless struggle against removable odds that concerns the social legislator and the rational philanthropist, who by their aid and co-operation would materially assist in the social amelioration of the present age.

It is difficult in a brief outline to present a working plan of social research, applicable alike to the many and widely different problems which require consideration. Every such investigation should of necessity be preceded by a preliminary research into the available literature of the subject, from which such extracts should be made as afford an intelligent historical retrospect of what has been done or accomplished in the same direction in the past. Such preliminary research would bring out the fundamental essentials of the subject and emphasize the direction which an original inquiry should take and the scope of the same in the light of a past experience. The second requirement is a complete statistical abstract of all the existing statistical material relating to the subject under consideration, critically reviewed and subjected to a qualified analysis to determine the statistical scope of the proposed inquiry and to emphasize the elements of most determining and practical impor-

* Chambers's "Papers for the People," vol. ix, art. Industrial Investments and Associations. Philadelphia, 1854.

tance. Upon such a basis of descriptive and statistical information a working plan can be formulated for the third step of an *original personal inquiry* into the actual conditions and facts of the question and problem under investigation. The personal inquiry should be made by the very best obtainable talent, thoroughly familiar with the technical elements of the problem, to secure an absolutely trustworthy basis for subsequent conclusions. The results of personal investigation should be recorded in full detail from day to day as the investigation proceeds, to eliminate as far as possible errors resulting from defects of memory or the accidental omission of minor details which by accumulation might assume considerable importance. It cannot be too much emphasized that for such an investigation the best possible talent should be secured, upon exactly the same principle as expert chemists of the highest grade are employed in commercial enterprises to carry on original research for the purpose of introducing far-reaching changes in commercial practice. The method followed in the original inquiry should be fully described, so that every fact of possible importance should be fully known and every observation of value made by the investigator should be made a matter of permanent record.

The fourth step in the investigation should be the tabulation of new statistical material obtained by personal effort and its co-ordination to data previously collected or otherwise secured. The fifth and last step should be the final analysis of all the material brought together in the form of a convenient report, thoroughly indexed, with the conclusions set forth in the form of a broad generalization, precisely emphasizing the essential points demanding consideration, with the recommendations warranted in the light of the facts secured. There is nothing new in this method, which has been followed in many social and economic investigations, except the order of the arrangement and the definite connection between the investigation, the conclusions, and the ultimate recommendations. In other words, it is of the utmost importance that the responsibility of the investigator should be absolutely fixed by the final suggestions for specific action warranted in the light of indisputable truths.

When this method is followed, it will be found that the conclusions speak so emphatically for themselves that the recommendation for specific action remains an unquestionable argument in favor of a rational and practical theory of social reform.

Having briefly outlined the utility of social statistics and a practical method of social research, I would briefly call attention to a number of the more important problems which require to be investigated and reported upon along the lines previously indicated. It will be impossible for me to enlarge beyond the mere mention of the specific subjects, except to indicate similar lines of inquiry or the urgent necessity of a better knowledge of the facts than is at present extant. All of these problems bear immediately upon the question of poverty and pauperism and to a considerable extent upon dependence in old age, resulting from social inefficiency or ill-adjustment of existing social conditions.

THE PROBLEM OF WAGE-EARNERS' EXPENDITURES.

(1) I would suggest a really conclusive inquiry into the subject of income expenditures among wage-earners and others for the essentials of life, and the relation of such expenditures to savings, investments, and accumulations for self-support in old age. Such investigations have frequently been made, but as a rule under serious limitations. It would be desirable to very materially enlarge the scope of such an inquiry, although possibly reducing the number of items of expenditures to be considered. Of recent investigations in this direction the most useful and suggestive are "The Wage-earners' Budgets" in Rountree's "Study of Poverty in York," the investigation of the Economic Club of London, the Family Monographs by Elsa G. Herzfeld, Wage-earners' Budgets by Mrs. L. B. More, published in 1907; also, the various investigations by Federal and State governments; and, finally, the rather extended investigation by the British Board of Trade, published as a memorandum of the consumption and cost of food in workmen's families, in 1904. (See Statistical Appendix No. I.)

THE PROBLEM OF PERIODICAL SAVINGS.

(2) There is urgent need of a conclusive inquiry into the actual distribution of wealth among wage-earners in representative industrial cities, to ascertain the extent to which periodical or systematic deductions are made from the weekly income for purposes of permanent savings and investments as security against dependence in old age. The various investigations which have been made into the distribution of wealth in the United States, among others the treatise by Charles B. Spahr, preclude anything like a rational conclusion as to the exceedingly important question whether the widely diffused material prosperity of the United States is substantially increasing the economic security of the masses by personal accumulation of registered property. It is of importance to keep in mind the fundamental distinction between temporary material well-being resulting from high wages and the permanent accumulations in the form of capital invested in registered property by an increasingly larger proportion of the population. Only the latter can be considered real prosperity and of permanent utility to the nation, as well as the people at large. To the extent to which systematic deductions are made from weekly earnings for the purpose of accumulations and investments, the actual wealth of the nation will increase, or correspondingly diminish where this is not the case.* Equally intimate is the relation of dependent poverty, especially in old age, to systematic habits of savings during the active or productive period of life. An investigation along these lines would be productive of the greatest possible benefit, to set at rest the often extreme and

* This problem, of course, is as old as the industrial history of nations. As early as 1677, a Mr. Henry Peacham published a tract on "The Worth of a Penny: or, A Caution to Keep Money. With the Causes of the Scarcity and Misery of the want thereof, in these hard and Merciless Times. As also how to save it, in our Diet, Apparel, Recreations, etc., and also what honest Courses men in want may take to live."

Another early publication on this subject is "Documents Relative to Savings Banks, Temperance and Lotteries," published by order of the Society for the Prevention of Pauperism in the City of New York, 1819, probably suggested by an earlier publication by the Right Hon. George Roe on "Observations on Banks for Savings," London, 1816. The same year there was published an "Essay on Provident or Parish Banks for the Security and Improvement of the Savings of Tradesmen, Artificers, Servants, etc., until Required

sinister assurances of those who hold that the actual as well as the relative degree of economic dependence is greater to-day than in former years.

DETAILS OF SAVINGS-BANK ACCUMULATIONS.

(3) Closely connected with the preceding subject suggested for social research is the need of a qualified statistical inquiry into the essential details of savings-banks accumulations, to determine how far such accumulations are really the deposits of wage-earners. It would serve a very useful purpose to ascertain the occupations or elements of the wage-earning population most inclined to make use of these institutions and the relative size of the amounts accumulated, the period of time required to produce the accumulation, the average deposits made per annum or during shorter periods, the effect of interest on the deposits, and the extent to which such interest payments are utilized to provide for self-support during periods of unemployment or in old age. There is as yet but a very fragmentary literature of the subject, and only a very limited analysis has ever been made of the entire subject of savings-banks accounts. One of the earliest investigations of this kind was made by Hon. Carroll D. Wright, as Commissioner of Labor of Massachusetts, in 1873, and no subsequent investigation has been made which would permit of definite conclusions as to the social utility of savings-banks to carry out the laudable intentions and purposes which lie at the basis of these useful institutions. (See Statistical Appendix No. 3.)

for their Future Wants or Advancement in Life, containing a Brief History of the Several Schemes for the Above Purpose and Developing the Causes which have Promoted or Prevented their Success," by Barber Beaumont. Mr. Alexander Robertson in 1854 published an "Essay on Periodical Savings Applied to Provident Purposes, with Remarks on the Constitution and Practice of Friendly Societies and Savings Banks and Suggesting a Plan of Self-Protecting Life Insurance," inscribed with the following quotation from the *London Times* of Nov. 27, 1850: "There is not a more painful chapter in the history of our social condition than that which records the usual fate of our most deserving laborers, artisans, domestic servants, clerks, and others who in the turn of life and in the decline of power attempt to get a better interest for their store than the £2 15s. per annum which is all that the savings bank can afford."

THE PROBLEM OF SAFE INVESTMENTS BY WAGE-EARNERS
AND THE POOR.

(4) Equally important, if not more so, is the necessity of an inquiry into the entire subject of investments by wage-earners and others, including the poor or casual laborers, to determine whether such investments as are made by the least prosperous element of the population are, on the whole, best adapted to their needs, in combining the essentials of absolute security with a fair degree of remunerative return. This subject has attracted considerable attention abroad, and, especially in England, investigations have been made from time to time, some of which at least have been productive of very good results. There is not the slightest reason to question the prevailing opinion that enormous amounts saved, as the result of industry and frugality, by wage-earners are wasted and dissipated in worthless investments made upon pretended assurances of exceptional security and exceptionally profitable results. It would be of value to determine for a sufficiently large number of wage-earners, in representative industrial centres, the character of their investments in lands and houses, tenement property, shares in industrial or other corporations, state or municipal obligations, or any other form of registered property. It would also be of value to include in such an inquiry the subject of betting and gambling, to ascertain how far the earnings of the poor and fairly well-to-do are wasted in these directions. As a basis for any rational inquiry into the subject of State pensions, which is assuming an ever-increasing importance, it would be of much practical value to know how far among the aged of the present period there are those who were formerly wage-earners, but who found it possible by thrift, economy, and good judgment to secure for themselves a reasonable competency for the needs of their declining years. Manifestly, the lesson of such lives must needs be of the greatest possible educational value, as proving conclusively the possibility of obtaining by frugality, self-denial, and good judgment

what is by some demanded as a gratuity or modified form of poor-relief from the States. (See Statistical Appendix No. 4.)

THE PROBLEM OF PREVENTABLE INDUSTRIAL DISEASES.

(5) One of the chief causes of poverty is preventable illness and premature mortality on the part of the bread-winner or other wage-earning members of the family. A comprehensive investigation into the relation of preventable disease to poverty in general, and in particular to dependence in old age, would serve a most useful purpose by emphasizing the cost and economic consequences of preventable sickness. The public burdens resulting from preventable diseases are very much greater than generally assumed, but even greater is the impaired physical efficiency, caused by tuberculosis, typhoid, and other preventable diseases. Newsholme, one of the foremost English authorities, has emphasized the intimate relation which exists between poverty and disease, and it is a generally accepted theory that the duration of life among the poor is much less than among the well-to-do, while even greater among them is the amount of preventable disease. Only one really conclusive investigation has been made in this country into the subject of acute and chronic diseases among the population at large, in connection with the last State Census of Massachusetts, which indicates the direction that such investigations should take among some selected elements of the population, with special reference to the relation of poverty to disease.

It is true that, in a measure, the economic consequences of illness among wage-earners are mitigated by insurance, but the effects are most serious among the poor and even the pauper element, among whom insurance protection is practically out of the question by reason of their poverty. Such an inquiry might be enlarged to include the whole problem of possible physical deterioration and its relation to poverty and physical impairment, with special reference to economic dependence in old age. Extensive investigations in this direction have been made in England by a Departmental Committee, amplified

by numerous statistical researches into the physical condition of school children.* The conclusions of these investigations are decidedly to the effect that poverty bears heavily upon the physical side of life, and is, unquestionably, an immediate cause of physical deterioration. In this country, on account of the heterogeneous population of our large cities, the problem is much more complex and requires to be investigated with much greater care. Anthropometric measurements of different elements of the population would serve a decidedly practical purpose, provided they are made to include the adult population employed in industries liable to physical over-strain and other resulting industrial diseases. Most of the existing data upon the relation of factory labor to the health of the operatives are antiquated, and no longer of practical value as a guide in modern factory legislation.† (See Statistical Appendix No. 5.)

THE PROBLEM OF PREVENTABLE INDUSTRIAL ACCIDENTS.

(6) A corresponding inquiry into the subject of industrial accidents, the cause of their frequency and most practical method of prevention, but in particular such accidents as occur in disproportionate numbers among men employed in mining, on railroads, in shipping, building operations, etc., would serve an equally important purpose, more so in view of the increasing agitation for radical legislation upon the subject of employers' liability. Remarkable as the statement may sound, there has never been made a qualified inquiry into the subject of industrial accidents and their economic importance as contributory causes to dependence in old age, nor has much progress been made in the direction of reducing the frequency of industrial accidents to a minimum. In fact, the risk in certain occu-

* Report on Physical Deterioration, 3 vols. London, 1904. Parliamentary Papers, Cd. 2175, 2186, and 2210. See also Report of Investigation into Social Conditions in Dundee, Scotland, published by the Dundee Social Union, 1905.

† The recent Report of the British Departmental Committee on Industrial Diseases may be consulted to advantage. The same has been published as Parliamentary Papers, Cd. 3495-96. London, 1907.

pations is greater to-day than in former years, and the subject lends itself peculiarly to social research, in that many of the associated phenomena are outside of the scope of a strictly limited statistical investigation. In connection with such an inquiry the subject of employees' benefit funds might properly receive special consideration and also the related subject of a voluntary or compulsory system of old age pensions among persons employed in exceptionally hazardous occupations. There is probably no subject upon which more misleading information has been printed than government insurance as it is practised in certain European countries, and an entirely disinterested qualified investigation of the relation of state effort in this direction might prove decidedly beneficial as an aid towards a better understanding of the true labor problems of the present day. (See Statistical Appendix No. 6.)

THE PROBLEM OF EMPLOYMENT FOR THE CRIPPLED AND THE OTHERWISE PHYSICALLY IMPAIRED.

(7) Closely related to the subject of industrial diseases and industrial accidents is the necessity for qualified research into the most practical method and means of procuring suitable employment for persons injured, crippled, or otherwise impaired in physical efficiency in consequence of their occupation. At present it is a deplorable fact that these unfortunates often become public charges or find themselves dependent upon a small pension, but with no useful occupation. Inquiry should be made as to whether fairly remunerative employment cannot be found for these unfortunates, or occupations peculiarly adapted to the needs of the adult blind, the one-armed or one-legged, or otherwise physically impaired, so that they may not be forced, after a life of honest industry, to live their remaining years in total idleness as beggars, or otherwise dependent upon private or public charity. (See Statistical Appendix No. 7.)

THE MORTALITY AND MORBIDITY OF WAGE-EARNERS AND THE POOR.

(8) There is need of a qualified investigation into the whole subject of mortality and morbidity of wage-earners and their families, including the poor and the pauper class, to determine how far the incidence of premature mortality falls upon this element because of its poverty, and to ascertain the most practical means by which such mortality, both in infancy and old age, may be substantially reduced to the normal rate prevailing among economically better situated elements of the population. In part this inquiry includes the investigation into the subject of the relation of preventable disease to poverty and industrial accidents previously referred to, but in its larger aspects the problem of death is the most significant and perhaps the most important, affecting the welfare and progress of the race. There are, unfortunately, no trustworthy comparative tables of mortality for the different elements of the population according to their economic condition, except such as relate to certain foreign cities and countries, where the conditions of life are probably quite different from those existing in the United States. There can be no question whatever but that, while the crude death-rate has declined within the last generation, there is still a very lamentable amount of premature mortality, especially in infancy, but also at every period of adult life. So that, broadly speaking, even among the more satisfactory conditions of present-day civilization, a relatively small proportion attain to normal old age, which should afford a period of gratifying retrospection after years of continuous industrial activity. The researches into this subject by Metchnikoff and others warrant the conclusion that we are as yet very far from having attained to the largest possible average duration of human life, but in particular is this true of the industrious poor, who are exceptionally exposed to conditions diametrically opposed to good health and long life. Considering that among this element the years of life are practically the only real capital available, and that premature death is the greatest affliction which can come

to a wage-earner's family; and considering further that, aside from every other sentimental consideration, the economic consequences of death alone are often very serious, as including the possible expenses of a long illness and the unfortunately extravagant expenditure for burial and mourning, the economic aspects of premature death assume the greatest possible importance the more thoroughly the entire subject of human mortality is taken into consideration.

It is one of the most definite evidences of modern advancement that at last certain preventable diseases are being singled out for associated effort in the reduction of their frequency, among which for the present pre-eminently stands tuberculosis, as perhaps the most important of them all. Of nearly equal importance, however, are the efforts made towards the reduction of infant mortality along lines of effort which are gradually becoming more scientific and correspondingly more effective, and the same is true of other preventable diseases, such as typhoid, malaria, and yellow fever. The more clearly the facts of the subject are understood and the more effectively the truth is replacing guesswork opinion, the more satisfactory the results to the community at large, and in particular to the wage-earning element and the poor. In no direction is the evidence of the value of scientific research so overwhelming as in the case of malaria and yellow fever, regarding which all former theories were at once overthrown by the results of a qualified inquiry into the actual facts and circumstances favoring the transmission of the disease through a particular species of mosquitoes to human beings. While the risk of epidemics of these diseases can never be entirely eliminated, it has been reduced to a minimum, and it is safe to hold that any subsequent outbreaks will never again assume the serious proportions of the past.

It is necessary to emphasize these evidences of the value of scientific research in one direction to prove the corresponding value of such research in other directions more immediately applicable to the solution of pending problems of social life. However remote the connection may appear between the prob-

lem of preventable disease and the problem of preventable poverty, it will be found upon careful inquiry that there is a very close connection, which warrants the conclusion that the elimination of the one will largely aid in the elimination of the other.

THE PROBLEM OF SUICIDE.

(9) One very important subject which has thus far attracted but a very limited amount of attention is the frequency of suicide, which appears to be decidedly on the increase throughout the country, but chiefly among a class which may be considered the failures in life, as it is viewed from a purely individual and material standpoint. Suicide occurs chiefly among men at an age of the greatest possible economic value, when the largest expenditure has been made in behalf of the individual with the hope of an adequate economic return. While much has been written upon the causes of suicide, there has lately been made one suggestion which appears to connect the act of self-murder in many instances with visual defects, or eye-strain. Dr. George M. Gould, of Philadelphia, who has investigated the subject quite extensively, has come to some very definite conclusions which would make it strongly probable that many cases of self-murder could easily be prevented by the correction of such defects and the restoration of normal eyesight, with the resulting elimination of mental and physiological disturbances. Suicide is rarely the result of an immediate impulse, but the contemplation of the act usually extends over a period of years, and, if qualified advice were rendered at the opportune moment, many a one would be assisted over a brief period of despondency and live to fulfil the larger and higher purposes of life. Considering that there occur annually in the United States not less than ten thousand suicides and that a large number of these individuals are bread-winners and the heads of dependent families, including women and children, who because of wilful death become a charge upon the community and a public burden, the subject is one which seems to lend itself to social research

and regarding which a true statement of the facts would be of great practical value. (See Statistical Appendix No. 9.)

THE PROBLEM OF PHYSICAL DETERIORATION.

(10) In conclusion, I may call attention to the serious problem of possible physical deterioration as the result of the ever-increasing proportion of population living under urban conditions, made best evident in the physical condition of children during the period of school life. Qualified investigations which have been made into this subject indicate the probable intimate relation which exists between unhygienic conditions of home and school life and resulting ill-health and impaired physical efficiency in later years. What has been done in this direction by the New York Committee on the Physical Welfare of School Children is most commendable, but the field of inquiry requires to be very much enlarged, so that the conclusions regarding the different elements of the population according to race and nationality may rest upon a more substantial basis of statistical material than is at present the case.

Investigations made in Scotland by Mackenzie and Foster furnish conclusive evidence that the physical status of the children of the poor is decidedly inferior to that of the children of the prosperous and well-to-do, and from their report, which was published last year, regarding the physical condition of the school children of Glasgow, I quote in part as follows:—

If we take all the children of ages from 5 to 18, we find that the average weight of the one-roomed boy is 52.6 lbs.; of the two-roomed, 56.1 lbs.; of the three-roomed, 60.6 lbs.; of the four-roomed and over 64.3 lbs. The respective heights are 46.6 inches; 48.1 inches; 50.0 inches; and 51.3 inches. For girls, the corresponding figures are:—Weights, 51.5 lbs.; 54.8 lbs.; 59.4 lbs.; 65.5 lbs. The heights are 46.3 inches; 50.8 inches; 49.6 inches; 51.6 inches. These figures show that the one-roomed child, whether boy or girl, is always on the average distinctly smaller and lighter than the two-roomed; and the two-roomed than the three-roomed; and the three-roomed than the four-roomed. The numbers examined are so large, and the results are so uniform that only one conclusion is possible, viz.:—that the poorest child suffers most in nutrition and in growth. It

cannot be an accident that boys from two-roomed houses should be 11.7 lbs. lighter on an average than boys from four-roomed houses and 4.7 inches shorter. Neither is it an accident that girls from one-roomed houses are, on the average, 14 lbs. lighter and 5.3 inches shorter than the girls from four-roomed houses.

The results of this investigation clearly emphasize the value of social research and of trustworthy social statistics secured by qualified investigators in strict conformity to the methods of science. They teach emphatically the duty of preventive methods in place of mere thoughtless giving of relief, for, as the Committee of the Charity Organization Society of Edinburgh have well said, in their equally important report upon the physical condition of the children of that city, after first calling attention to the needless suffering of children, "plainly and emphatically attributed to an excessive indulgence in strong drink," that "One other fact also is plain, and that is the wastefulness and demoralization caused by unsystematic and indiscriminate charitable relief"; and to this they add the following very suggestive words, "It cannot be doubted that many agencies and persons hinder who seek only to help, and the pity of it is that those who secure the bounty of a well-disposed, but indiscriminate, philanthropy are the least deserving."

The literature of poverty, pauperism, its causes and remedies, is enormous, but almost entirely wanting in a statement of indisputable facts or of social statistics useful, and in truth indispensably necessary, for qualified social research. Efforts without number have been made through all the ages and throughout the world to relieve suffering and sorrow, while few qualified attempts have been made to remove the causes of strictly preventable poverty. In the words of Mr. Edward Dennis, one of the truest friends of the poor of Scotland, whose works, next to those of Chalmers, are the most stimulating and practical, though written forty years ago: "The public seems really awakening at last to some sort of perception of the precipice society in this country is approaching, through the maladministration of the Criminal and Poor Laws. Charity, too, is a frightful evil,—not real charity, but subscription charity. Every

human being has scope enough for all the money and all the effort he can spare in behalf of misfortunes which are known to himself personally, or to the members of his home circle. The gigantic subscription lists, which are vaunted as signs of our benevolence, are monuments of our indifference."*

I have quoted these lines to emphasize the necessity of scientific social research, since there is a very serious danger, if not a practical certainty, that in our indifference toward strictly scientific inquiries in matters of this kind we content ourselves with the result of superficial investigations or unwarranted assurances, which, it must be reluctantly admitted, only too often, if not as a rule, guide in the social legislation of the present day. Dispassionate inquiry and a strict regard for the absolute truth and entire disinterestedness in the statement of the facts and conclusions must needs, in the course of time, secure better results in efforts to ameliorate the condition of the poor than the numerous and varied philanthropic benevolences, tending largely to continue or keep alive the very evils which they are supposed to relieve, to eliminate, or to cure. (See Statistical Appendix No. 10.)

Social research along the lines indicated is, therefore, an imperative duty and the pre-requisite for national social progress, and nowhere in the world more needed than in these United States, where, by a combination of circumstances and conditions the problems of poverty and social discontent are coming to the front at a much earlier period in our national existence than our enormous natural resources would have led us to anticipate. To research work of this character the very best ability may very well devote itself, since the advancement of the nation's interest cannot be better conserved than by the seeking for the truth which concerns national social progress and by a statement of facts and conclusions which will serve as an unerring guide in the patriotic aim to make this land of ours a better land to live

* Consult "The State and Charity," by Thomas Mackay, London, 1898; also "The Dead Hand," by Sir Arthur Hobhouse, London, 1880; and the very early and rare "Plan to Prevent Charitable Donations for the Benefit of Poor Persons from Loss, Embarrassment, Non-Application, Misapplication, Fraud and Abuse in Future," by William Beckwith, London, 1807.

in. The problem of poverty and social discontent resolves itself finally into one of rational education, which, however, is out of the question until the true principles of social science are first ascertained and made known in the form of a broad generalization within the understanding and the comprehension of the American people. Social research which will eliminate the overwhelming amount of error and falsehood which now permeates public opinion upon the most important questions demanding solution will serve the highest possible purpose which any effort in this direction can aim to secure for the betterment of the human race.

STATISTICAL APPENDIX TO PROBLEM NO. 1.

FAMILY EXPENDITURES OF WAGE-EARNERS IN THE UNITED STATES.

Result of Investigation of United States Department of Labor (2,567 Families).

Average Expenditure for	Amount.	Per Cent.
Food	\$326.90	42.54
Rent	99.49	12.95
Clothing	107.84	14.04
Fuel and light	40.38	5.25
Insurance (life)	19.44	2.53
Miscellaneous	174.49	22.69
Total	\$768.54	100.00

NOTE.—The average income of these 2,567 families was \$827.19, which, after deducting average expenditures of \$768.54, leaves a margin for savings and investment of \$58.65. The average size of the family was 5.3. (See Eighteenth Annual Report of United States Commission of Labor, p. 648.)

STATISTICAL APPENDIX TO PROBLEM NO. 3.

CLASSIFICATION OF SAVINGS-BANK DEPOSITS RECEIVED DURING THE YEAR ENDING
OCT. 31, 1904, BY MASSACHUSETTS SAVINGS-BANKS.

	Number.	Amount.
Of \$50 and less	1,376,119	\$24,887,142.06
Exceeding \$50 and not more than \$100	192,462	15,534,343.10
" 100 " " 200	82,793	12,762,374.63
" 200 " " 500	62,501	22,223,022.52
" 500 and less than \$1,000	17,627	12,540,411.10
Of \$1,000 or more	11,685	12,068,984.35
	1,743,187	\$100,016,277.76

Twelve thousand eight hundred and sixteen transfers, amounting to \$5,449,870.92, are not included in the above table.

COMPARATIVE CLASSIFICATION OF DEPOSITS RECEIVED DURING YEARS 1894, 1899, 1904,
BY MASSACHUSETTS SAVINGS-BANKS.

	Percentage of Whole Number of Deposits.		
	1894.	1899.	1904.
Deposits of \$50 and less	75.52	77.43	78.94
" over \$50 and not exceeding \$100	12.06	11.12	11.04
" " 100 " " 200	5.54	5.03	4.75
" " 200 " " 500	4.44	4.30	3.59
" " 500 " " 1,000	1.38	1.24	1.01
" of 1,000 or more	1.06	.88	.67

SAVINGS-BANKS STATISTICS OF CONNECTICUT.

Year ending Oct. 1, 1907.

Items.	Oct 1, 1907.
Number of depositors having less than \$1,000	464,341
Amount of such deposits	\$99,447,721.30
Depositors having \$1,000 and not over \$2,000	50,664
Amount of such deposits	\$66,877,950.99
Depositors having \$2,000 and not over \$10,000	24,446
Amount of such deposits	\$84,177,692.77
Depositors having over \$10,000	422
Amount of such deposits	\$5,868,696.50
Total number of depositors	539,873
Total amount of deposits	\$256,372,061.56
Largest amount due a single depositor	\$54,109.21
Average amount due depositors	\$474.87

STATISTICAL APPENDIX TO PROBLEM NO. 4.

STATISTICS OF SAVINGS-BANKS AND INDUSTRIAL INSURANCE IN THE UNITED STATES,
1875-1906.

Years.	Savings-banks.		Industrial Insurance.	
	Number of Deposits.	Amount of Deposits.	Number of Policies.	Amount of Insurance.
1875	2,359,864	\$924,037,304	—	—
1876	2,368,630	941,350,255	8,416	\$443,072
1877	2,395,314	866,218,306	11,226	1,030,655
1878	2,400,785	879,897,425	22,808	2,027,888
1879	2,268,707	802,490,298	60,371	5,651,589
1880	2,335,582	819,106,973	236,674	20,633,469
1881	2,528,749	891,961,142	367,453	33,501,740
1882	2,710,354	966,797,081	590,053	56,564,682
1883	2,876,438	1,024,856,787	877,334	87,793,650
1884	3,015,151	1,073,294,955	1,092,529	111,115,252
1885	3,071,495	1,095,172,147	1,377,150	145,938,241
1886	3,158,950	1,141,530,578	1,780,372	198,431,170
1887	3,418,013	1,235,247,371	2,310,003	255,533,472
1888	3,838,291	1,364,196,550	2,797,521	305,155,182
1889	4,021,523	1,425,230,349	3,365,461	365,841,518
1890	4,258,893	1,524,844,506	3,883,529	429,521,128
1891	4,533,217	1,623,079,749	4,319,817	481,919,116
1892	4,781,605	1,712,769,026	5,200,777	583,527,016
1893	4,830,599	1,785,150,957	5,751,514	662,050,129
1894	4,777,687	1,747,961,280	6,833,439	800,946,170
1895	4,875,519	1,810,597,023	6,952,757	820,740,641
1896	5,065,494	1,907,156,277	7,388,119	888,266,586
1897	5,201,132	1,939,376,035	8,005,384	996,139,424
1898	5,385,746	2,065,631,298	8,798,480	1,110,073,519
1899	5,687,818	2,230,366,954	10,050,847	1,293,125,522
1900	6,107,083	2,449,547,885	11,219,296	1,468,986,366
1901	6,358,723	2,597,094,580	12,337,022	1,640,857,553
1902	6,666,672	2,750,177,290	13,448,124	1,806,890,864
1903	7,035,228	2,935,204,845	14,603,694	1,977,599,397
1904	7,305,443	3,060,178,611	15,674,384	2,135,859,103
1905	7,696,229	3,261,236,119	16,872,583	2,309,754,235
1906	8,027,192	3,482,137,198	17,841,396	2,453,616,207

STATISTICAL APPENDIX TO PROBLEM NO. 5.

COMPARATIVE MORTALITY STATISTICS BY OCCUPATIONS, ENGLAND AND WALES, 1890-92.

Rate per 1,000 Living at each Period of Life.

Ages.	Occupied Males (England and Wales).	Occupied Males Industrial Districts.	Occupied Males Agricultural Districts.	Unoccupied Males.
15-19	2.6	3.1	2.1	35.9
20-24	5.1	5.5	4.7	29.6
25-34	7.3	8.7	6.0	27.1
35-44	12.4	15.9	9.0	35.7
45-54	20.7	27.8	13.8	37.8
55-64	36.7	50.2	26.1	59.4
65 and over	102.3	120.4	93.9	105.9

THE PERCENTAGE DISTRIBUTION OF DEATHS FROM CONSUMPTION IN THE MORTALITY FROM ALL CAUSES BY SELECTED OCCUPATIONS.

Industrial Mortality Experience of the Prudential Insurance Company of America, 1897-1906.

Occupations.	Percentage of Deaths from Consumption at Specified Periods of Life.				
	15-24.	25-34.	35-44.	45-54.	55-64.
Brass Workers	59.1	50.0	45.1	24.1	20.4
Carpet and Rug Makers	52.9	45.5	35.3	20.8	11.8
Glass-cutters	26.9	46.7	40.7	25.0	12.5
Grinders	57.1	70.8	63.2	40.0	25.0
Hatters	53.8	55.4	45.4	26.7	14.8
Polishers	45.8	56.0	42.7	22.9	21.1
Printers	48.6	56.4	40.5	19.9	9.2
Spinners	46.4	50.0	44.4	25.9	2.7
Stone Workers	47.6	52.6	47.7	39.2	26.1
Tailors	39.6	58.8	36.0	17.3	10.1
Weavers	39.8	53.4	38.1	25.7	10.9
Woollen Mill Employees	35.0	43.8	35.7	21.1	12.5

MORBIDITY STATISTICS OF MASSACHUSETTS, 1905.

Result of State Census.

Ages.	Acute Diseases (accidents included).			
	Males.		Females.	
	Number of Cases.	Rate per 1,000 Living.	Number of Cases.	Rate per 1,000 Living.
Under 16	732	1.55	648	1.37
17-29	409	1.11	451	1.10
30-49	557	1.30	556	1.28
50-69	310	1.67	319	1.53
70 and over	71	1.75	97	1.83
All ages	2,081	1.38	2,089	1.32

MORBIDITY STATISTICS OF MASSACHUSETTS, 1905.

Result of the State Census.

Ages.	Chronic Diseases (accidents included).			
	Males.		Females.	
	Number of Cases.	Rate per 1,000 Living.	Number of Cases.	Rate per 1,000 Living.
Under 16	623	1.32	568	1.20
17-29	979	2.65	923	2.25
30-49	2,356	5.48	2,511	5.78
50-69	5,394	29.01	4,253	20.32
70 and over	2,468	60.94	2,125	40.19
All ages	11,825	7.85	10,392	6.56

NOTE.—For a discussion of these statistics see my article in the *Spectator* for Dec. 19 and 26, 1907.

STATISTICAL APPENDIX TO PROBLEM NO. 6.

THE FATAL ACCIDENT RATES IN COAL MINING AND RAILROAD TRANSPORTATION IN THE UNITED STATES, 1890-1906.

Rates per 1,000 of Persons Employed.

	Railroad Mail Clerks, etc.	Railroad Trainmen.	Railroad Switch- men, Flagmen, Watchmen.	Other Railroad Employees.	Total Railroad Employees.	Coal Mining, North America.
1890	0.69	9.52	6.21	1.36	3.27	2.43
1891	2.16	9.57	7.44	1.42	3.39	3.30
1892	0.78	8.88	6.85	1.24	3.11	2.51
1893	1.50	8.72	6.67	1.32	3.12	2.53
1894	0.58	6.43	5.00	1.00	2.34	2.48
1895	0.99	6.45	5.75	0.93	2.31	2.67
1896	0.67	6.57	4.74	0.93	2.25	2.79
1897	1.85	6.05	4.59	0.83	2.06	2.34
1898	0.88	6.68	5.14	0.88	2.24	2.59
1899	0.72	6.46	5.61	1.11	2.38	2.98
1900	0.46	7.30	5.36	1.14	2.51	3.25
1901	0.78	7.35	3.68	1.18	2.50	3.24
1902	0.95	7.43	3.96	1.20	2.50	3.49
1903	1.75	8.16	5.66	1.24	2.75	3.14
1904	1.60	8.33	4.95	1.29	2.80	3.37
1905	0.99	7.50	2.99	1.15	2.43	3.44
1906	1.20	8.09	2.96	1.24	2.58	3.16

THE PERCENTAGE DISTRIBUTION OF DEATHS FROM ACCIDENTS IN THE MORTALITY FROM ALL CAUSES BY SELECTED OCCUPATIONS.

Industrial Mortality Experience of the Prudential Insurance Company of America,
1897-1906.

Occupations.	Percentage of Deaths from Accidents at Specified Periods of Life.				
	15-24.	25-34.	35-44.	45-54.	55-64.
Boatmen	54.6	24.7	18.1	31.0	14.7
Captains (navigation)	60.0	66.7	14.3	30.0	13.3
Electric Linemen	55.3	56.8	38.2	30.0	—
Fishermen	45.5	36.8	23.8	10.0	7.5
Miners (1897-1902)	51.4	48.5	40.4	18.2	10.8
Quarrymen	77.8	45.5	32.4	28.6	18.6
Railroad Brakemen	83.4	69.6	52.7	48.1	29.6
Railroad Conductors	50.0	42.9	31.0	22.7	17.6
Railroad Engineers	40.0	61.9	37.9	25.0	19.5
Railroad Firemen	64.8	58.9	43.5	14.3	—
Railroad Flagmen and Switchmen	61.5	50.0	34.9	25.5	20.6
Sailors	50.7	17.3	24.2	12.7	10.2

STATISTICAL APPENDIX TO PROBLEM NO. 7.

PERSONS HAVING DEFECTIVE PHYSICAL CONDITIONS,—MASSACHUSETTS, 1895.

Result of the State Census.

	Males.	Females.	Total.
Acute diseases	1,132	1,361	2,493
Chronic diseases	7,034	6,394	13,428
Maimed	2,543	267	2,810
Lame	4,175	2,490	6,665
Bedridden	55	188	243
Paralytic	1,394	1,098	2,492
Epileptic	469	281	750
Insane	584	926	1,510
Idiotic	571	365	936
Deaf	1,494	2,324	3,818
Dumb	50	37	87
Deaf and Dumb	423	334	757
Blind	1,672	1,269	2,941
Other defective physical conditions	690	435	1,125
Physical defects in combinations	1,150	656	1,806
Total	23,436	18,425	41,861

STATISTICAL APPENDIX TO PROBLEM NO. 9.

COMPARATIVE MORTALITY FROM SUICIDES.

American Cities, 1892-1906.

Years.	Population.	Suicides.	Rates per 100,000 Population.
1892	11,541,918	1,568	13.6
1893	11,862,348	1,937	16.3
1894	12,192,328	1,951	16.0
1895	12,535,743	1,992	15.9
1896	12,887,435	2,135	16.6
1897	13,250,791	2,372	17.9
1898	13,669,422	2,397	17.5
1899	14,014,422	2,327	16.6
1900	14,415,482	2,365	16.4
1901	14,829,438	2,489	16.8
1902	15,258,316	2,717	17.8
1903	15,701,501	2,998	19.1
1904	16,159,758	3,285	20.3
1905	16,643,724	2,987	18.0
1906	17,135,840	2,919	17.0
1892-1896	61,019,772	9,583	15.7
1897-1901	70,179,555	11,950	17.0
1902-1906	80,899,139	14,906	18.4

STATISTICAL APPENDIX TO PROBLEM NO. 10.

AVERAGE WEIGHT AND HEIGHT OF BOYS IN GLASGOW SCHOOLS ACCORDING TO THE
SIZE OF HOUSING ACCOMMODATIONS.

Age.	Average Weight (Pounds).				Average Height (Inches).			
	1 Room.	2 Rooms.	3 Rooms.	4 Rooms.	1 Room.	2 Rooms.	3 Rooms.	4 Rooms.
5	37.2	38.6	39.5	40.1	39.0	39.9	40.7	41.4
6	40.4	41.6	42.9	43.4	41.1	41.8	42.5	43.0
7	43.3	45.0	47.0	47.6	42.7	43.6	45.0	45.1
8	48.0	48.9	50.4	51.6	45.0	45.6	46.4	47.1
9	51.4	53.1	54.8	56.3	46.5	47.6	48.2	48.9
10	55.5	57.7	59.7	61.0	48.3	49.3	50.1	50.8
11	60.0	62.2	64.5	66.2	50.1	50.9	51.7	52.4
12	65.3	67.2	69.3	71.9	51.8	52.6	53.5	54.4
13	69.9	72.3	75.3	76.8	53.4	54.1	55.1	55.8
14	73.0	76.7	81.6	84.2	54.3	55.4	57.0	58.0

AVERAGE WEIGHT AND HEIGHT OF GIRLS IN GLASGOW SCHOOLS ACCORDING TO THE
SIZE OF HOUSING ACCOMMODATIONS.

Age.	Average Weight (Pounds).				Average Height (Inches).			
	1 Room.	2 Rooms.	3 Rooms.	4 Rooms.	1 Room.	2 Rooms.	3 Rooms.	4 Rooms.
5	36.6	37.8	38.0	39.2	38.9	39.8	40.2	41.0
6	39.5	40.5	41.0	43.1	40.6	41.4	42.0	43.2
7	42.9	43.7	44.6	46.0	42.7	43.2	43.9	44.7
8	45.9	47.1	48.6	50.3	44.3	45.0	45.9	46.5
9	49.6	51.4	52.8	54.7	46.2	46.9	47.7	48.6
10	53.5	55.4	57.6	58.7	47.8	48.7	49.6	50.3
11	59.3	60.1	62.4	64.6	49.9	50.5	51.3	52.1
12	64.0	66.3	68.7	70.6	51.6	52.6	53.4	54.1
13	71.9	73.9	76.3	79.3	53.9	54.8	55.5	56.4
14	74.0	79.8	84.3	89.1	54.8	56.3	57.6	58.6

CITY LIFE AND MALE MORTALITY.

BY J. E. BAKER.

The complexity of modern life appears in concentrated solution in the city. Here we find the demoralizing luxury of the ultra-rich and the awful squalor of the very poor; here, too, the nervous strain and the alluring temptations of the great industrial class, a class far more numerous and far more important than both the extremes of wealth and poverty taken together. Hence Dr. Ogle characterizes the city as "a mighty vampire, continually sucking the strongest blood of the country to keep up an abnormal supply of energy it has to give out in the excitement of a too fast and unwholesome life."

The breaking point in human vitality is death. How people die indicates in a considerable measure how they have lived and how succeeding generations will live. Says Dr. Farr: "There is a relation between death and national primacy . . . ; there is a relation between the forms of death and moral excellence or infamy." The economic life of the nation depends primarily upon the male sex, and more especially upon it during its years of vigorous maturity. Accordingly, we ought not to be satisfied with the mere knowledge that city death-rates are usually higher than those for the country, but should seek to determine how deadly is city life to men as a class.

The registration area, comprising the states of Rhode Island, Massachusetts, New York, New Jersey, Connecticut, New Hampshire, Michigan, Maine, and Vermont, by the United States census of 1900, had a death-rate in cities of 18.6 and in the rural portion of 15.4 per thousand of population. This higher city death-rate fell more heavily upon men than upon women, for, while the male death-rate in cities was 19.8 per

thousand, the female death-rate was only 17.5 per thousand. In the rural portion of the area, however, the death-rates for the two sexes were fairly equal, the male death-rate being 15.8 and the female 15 per thousand of respective populations. Since the male rate is generally higher than the female rate, it will be convenient to call this *difference against the males* "excess." Thus in the registration area the urban excess is higher than the rural excess by 1.5 per thousand of population. Is this typical of the whole United States?

For territory outside of the registration area the census of 1900 did not compute death-rates for the reason that the prevailing lax regulations permit many deaths to go unrecorded. It may be assumed, however, that the deaths of males are recorded with about the same degree of fidelity as the deaths of females: hence deficiencies in the rates which might be computed would be of amount rather than of proportion. From the laws of probability, then, it may be assumed that the omissions in each sex will be approximately equal, and, therefore, the male and female death-rates may be compared with each other, and that comparison carried from state to state.

Outside the registration area no distinction is made in the census between urban and rural populations or urban and rural deaths, but, if city life is particularly deadly to men, then, other conditions being equal, in those states where a large proportion of the population is found in cities, we shall find a high male excess. The census sets a population of 8,000 as entrance requirement to the rank of city, so the proportion of a state's population found in cities of 8,000 or more is used to determine the rank of that state in urban importance.

So many local influences are at work in every community, subduing or accentuating any general force, that in comparisons between individual states the universal law may be completely hidden. Therefore, it is necessary, after ranking the states according to urban importance, to consider them in groups. Computing the death-rate for each sex in each group (Table I),

TABLE I.

	Total Population found in Cities of 8,000 or over.	Male Death-rate.	Female Death-rate.	Ratio Male to Female Death-rate.	"Excess."
Rhode Island	81.2				
Massachusetts	76.0				
New York	68.5				
New Jersey	61.2				
Connecticut	53.2				
Illinois	47.1				
Maryland	46.9				
Pennsylvania	45.5				
California	43.7				
Delaware	41.4	16.88	14.90	1.133	1.98
New Hampshire	38.6				
Ohio	38.5				
Colorado	38.1				
Washington	31.9				
Michigan	30.9				
Missouri	30.8				
Wisconsin	30.7				
Montana	27.0				
Minnesota	26.8				
Utah	25.2	13.04	11.55	1.129	1.49
Indiana	24.2				
Wyoming	24.1				
Oregon	23.9				
Maine	23.7				
Louisiana	22.8				
Kentucky	16.4				
Iowa	16.8				
Nebraska	15.8				
Florida	15.0				
Virginia	14.7	12.47	11.88	1.049	0.59
Kansas	14.0				
Tennessee	13.4				
Texas	11.3				
Vermont	11.2				
Georgia	11.0				
West Virginia	7.7				
South Carolina	7.5				
Alabama	7.3				
Arkansas	5.4				
North Carolina	5.1	12.87	12.66	1.016	0.21
Oklahoma	5.0				
North Dakota	3.0				
South Dakota	2.6				
Mississippi	2.6				
Nevada	0				
Indian Territory	0				
New Mexico	0				
Idaho	0				
Arizona	0	11.04	11.06	0.998	-0.02

we find that in the first group of states the male excess is 1.98 per thousand of population; in the second group, 1.49; in the third, .59; in the fourth, .21; and, in the fifth, a minus .02, that is, a female excess. The gradation is marked by its regularity.

But perhaps this smaller male excess in the lower groups is due to the insufficiency of data. For instance, if the normal male death-rate is 16 and the female death-rate is 14, the excess is 2; but, if only half the data are gathered, the rates will be 8 and 7, respectively, and the excess will be only one, giving the gradation just noted. To satisfy this sound objection, use the method of ratios, with the female death-rate as the base, or 1. The ratio between 8 and 7 is the same as between 16 and 14. From this method the ratio in the first group is approximately 1.133; in the second group it is 1.129; in the third group, 1.049; in the fourth, 1.016; and, in the fifth, .998, giving the same gradation as before (See Table I, columns 2 and 3). The fact is established, then, that the male excess increases in size as the cities increase in importance.

The excess in the death-rate among males observable in the cities is not due to a peculiar age composition in the urban population. This is made evident by the census statistics for the registration area. Table II shows, in each of the eight age groups considered, an excess in the death-rate among males in cities as compared with the death-rate among males in the rural districts.

TABLE II.
EXCESS IN REGISTRATION STATES.

Ages	Under 1	Under 5	5-14	15-24	25-34	35-44	45-64	65-
Cities	31.6	10.6	0.1	0.7	1.3	2.1	4.0	7.6
Rural	27.4	6.4	.0	-0.1	-1.0	-0.4	0.7	6.3
Difference against city	4.2	4.2	0.1	0.8	2.3	2.5	3.3	1.3

Compiled from United States Census, *Vital Statistics*, Vol. I, p. lxxx.

To continue the investigation, each state may be studied with four age groups; viz., 0 to 14, 15 to 24, 25 to 54, and 55 upwards, corresponding to the periods of childhood, youth, maturity, decline. By using the same methods of computing rates and the same groups of ten states in each age group, as described in the preceding paragraphs, fairly similar results are obtained. In both the early periods, childhood and youth, the ratio of male to female death-rate shows a sudden drop between the first and second groups of states, while the third, fourth, and fifth groups show a fairly downward tendency in childhood and an indifferent tendency in youth (See Table IIIa). In the period corresponding to decline the movement is so irregular that any interpretation would be too involved and lengthy for present purposes, if at all plausible when done. It does not directly upset the thesis of this study, but it certainly does not support it, except in a far-fetched fashion, when the first two groups are compared with the last three (See Table IIIb).

But the age period 25 to 54, maturity, the age of greatest productivity, of greatest commercial stress, the age of home making and family rearing, the age of greatest vital interest and of greatest industrial importance,—this age, if any, should afford the crucial test as to whether or not the city is a ruthless destroyer of men. With a ratio falling by remarkably regular steps from 1.172 in the first group of states to 1.047 in the second group, then to .914 in the third, and .879 and .815 in the fourth and fifth, respectively, the hustle and dash, the nervous strain, the luxury and allurements of city life, are proved to be positive promoters of male mortality.

TABLE IIIa.
ANALYSIS BY AGE GROUPS AND GROUPS OF TEN STATES.

	Ages 0-14.			Ages 15-24.		
	Male Death-rate.	Female Death-rate.	Ratio Male to Female Death-rate.	Male Death-rate.	Female Death-rate.	Ratio Male to Female Death-rate.
Rhode Island . . .						
Massachusetts . . .						
New York						
New Jersey						
Connecticut						
Illinois						
Maryland						
Pennsylvania						
California						
Delaware	20.1	16.7	1.204	5.77	5.31	1.087
New Hampshire, . .						
Ohio						
Colorado						
Washington						
Michigan						
Missouri						
Wisconsin						
Montana						
Minnesota						
Utah	13.03	11.6	1.123	5.2	5.37	0.968
Indiana						
Wyoming						
Oregon						
Maine						
Louisiana						
Kentucky						
Iowa						
Nebraska						
Florida						
Virginia	12.6	11.2	1.125	5.65	6.19	0.913
Kansas						
Tennessee						
Texas						
Vermont						
Georgia						
West Virginia						
South Carolina						
Alabama						
Arkansas						
North Carolina	16.9	15.7	1.076	6.62	7.08	0.935
Oklahoma						
North Dakota						
South Dakota						
Mississippi						
Nevada						
Indian Territory, . .						
New Mexico						
Idaho						
Arizona	16.4	15.6	1.051	8.47	9.02	0.939

TABLE IIIb.
ANALYSIS BY AGE GROUPS AND GROUPS OF TEN STATES.

	Ages 25-54.			Ages 55 and over.		
	Male Death-rate.	Female Death-rate.	Ratio Male to Female Death-rate.	Male Death-rate.	Female Death-rate.	Ratio Male to Female Death-rate.
Rhode Island . . .						
Massachusetts . . .						
New York						
New Jersey						
Connecticut						
Illinois						
Maryland						
Pennsylvania						
California						
Delaware	11.0	9.47	1.172	51.7	46.8	1.105
New Hampshire						
Colorado						
Washington						
Michigan						
Missouri						
Wisconsin						
Montana						
Minnesota						
Utah	8.54	8.16	1.047	45.6	35.2	1.295
Indiana						
Wyoming						
Oregon						
Maine						
Louisiana						
Kentucky						
Iowa						
Nebraska						
Florida						
Virginia	8.3	9.08	0.914	40.9	37.0	1.105
Kansas						
Tennessee						
Texas						
Vermont						
Georgia						
West Virginia						
South Carolina						
Alabama						
Arkansas						
North Carolina	9.28	10.55	0.879	37.7	34.2	1.102
Oklahoma						
North Dakota						
South Dakota						
Mississippi						
Nevada						
Indian Territory						
New Mexico						
Idaho						
Arizona	10.04	12.32	0.815	41.8	38.0	1.100

Tables compiled by Westergaarde suggest that probably the city, with its physicians and hospital service and its freedom from severe muscular work, saves female life during this the child-bearing period rather than destroys male life at such a wholesale rate. The succeeding table, however, which shows that from these very causes connected with child-bearing the American city is more fatal to women than is the country, refute the suggestion squarely, so far as the United States is concerned.

It is plainly set forth now that, with the increase of cities in number and size, the death-rate of men grows higher and higher in comparison with the death-rate of women. In some groups of states during certain age periods this general statement does not hold good, but in the main it seems to be true. The natural inquiry is, What is the reason? To answer, in general terms, that city life is nerve-racking, artificial, and unsanitary, is to answer nothing that will point out any remedy. We must know at what *points* we are attacked before we can concentrate our forces to repel the assault. So an inquiry was made into the *causes* of death, to ascertain, if possible, what diseases are particularly fatal to men in cities.

The high excess of male mortality in cities in the registration area has been found to be typical of the whole United States hence the registration data for causes of death may be considered fairly indicative of conditions throughout the country.

On page 566, Vol. I, *Vital Statistics*, Census of 1900, a list of classified causes of death is given for the registration area, with the death-rates per 100,000 of population for each sex, from each cause, for both the urban and the rural districts (See Table IV). It will be noted that the city gives an excess from all causes of 234 (*Ibid.*, col. 5), while the country gives an excess of 85.2 (col. 6). Thus the city excess is 148.8 higher than the country excess (col. 7). We shall call this difference between the *excesses* of the respective districts "*preponderance*." By looking at the causes, it will be seen that only one class, Diseases of the Circulatory System, gives a large rural preponderance (in other words, a city *female* preponderance) of 24.3;

TABLE IV.

CAUSES OF DEATH.

Rates per 100,000 of Population. (Registration Area.)
(Vol. I, Vital Statistics, Census 1900, p. 566.)

	Cities.		Rural.		City Excess.	Rural Excess.	City Prepon- derance.
	Male.	Female.	Male.	Female.			
I. General Diseases . .	878.7	794.1	621.8	677.0	84.6	-55.2	139.8
Venereal Diseases . .	3.8	3.0	1.1	0.8	0.8	0.3	0.5
Alcoholism	14.1	3.7	5.7	1.1	10.4	4.6	5.8
Old Age	30.5	45.9	69.2	79.8	-15.4	-10.6	-4.8
Consumption	234.3	176.4	124.9	143.8	57.9	-18.9	76.8
Cancer and Tumor . .	46.4	83.1	51.8	91.8	-36.7	-40.0	3.3
II. Nervous System . .	221.3	195.7	232.0	212.2	25.6	19.8	5.8
III. Of the Circulatory System	150.0	146.6	177.2	149.5	3.4	27.7	-24.3
Heart Disease . . .	130.6	132.1	156.8	134.3	-1.5	22.5	-24.0
IV. Respiratory System .	356.6	314.4	200.0	198.0	42.2	2.0	40.2
Pneumonia	252.4	214.6	136.9	134.8	47.8	2.1	45.7
V. Digestive System . .	96.0	93.2	89.9	91.3	2.8	-1.4	4.2
VI. Urinary and Sexual Organs	131.4	114.3	106.5	75.3	17.1	31.2	-14.1
VII. Connected with Preg- nancy	—	27.6	—	24.5	-27.6	-24.5	-3.1
VIII. Bones and Joints . .	5.1	3.2	4.1	3.4	1.9	0.7	1.2
IX. Skin	3.5	2.8	3.2	2.5	0.7	0.7	.0
X. Absorbent System . .	1.3	1.3	1.6	1.7	0	-0.1	-0.1
XI. Accidents and Injuries, Suicides	127.2	42.8	122.9	41.4	84.4	81.5	2.9
Unknown	9.7	3.3	5.3	2.4	6.4	2.9	3.5
Unknown	9.4	7.5	21.7	18.9	1.9	2.8	-0.9
All Causes	1,980.5	1,746.5	1,580.9	1,495.7	234.0	85.2	148.8
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

and two classes, General Diseases and Diseases of the Respiratory System, give a city preponderance of 139.8 and 40.2, respectively; while the other classes about balance up each other.

In the difference, therefore, between the city preponderance of 180 from General Diseases and those of the Respiratory System, and the rural preponderance of 24.3 from Diseases of the Circulatory System, we have somewhat more than accounted for the general city preponderance of 148.8, having 155.7.

General Diseases include ordinary fevers, contagions, bodily disorders, alcoholism, old age, venereal troubles, cancers, tumors, consumption, etc. It is the most numerous class of diseases, being divided by the census into four sub-classes, containing in all 41 specific diseases, and being responsible for nearly a half of all deaths. No one of these specific diseases has a very large city preponderance except consumption. Consumption gives the alarming city preponderance of 76.8, nearly a half of the *total* city preponderance.

Diseases of the Respiratory System are seven in number, and the preponderances balance one another in such a manner as to leave a total *rural* preponderance, if it were not for pneumonia, which with a city preponderance of 45.7 brings the city preponderance for this class up to 40.2. From this table (Table IV), then, it would seem that two specific diseases, pneumonia and consumption, are responsible for nearly six-sevenths of the city preponderance, the exact figures being 122.5 to 148.8. All of the other 108 specifically mentioned diseases so balance each other as to yield a city preponderance of only 26.3,—barely one-third as large as consumption alone.

The “hustle and dash” and “nervous strain” of city life do not seem to be so fatal to men as might have been expected, for Diseases of the Nervous System give a city preponderance of only 5.8, and suicides one of only 3.5. Manufacturing and congested traffic is hazardous to men, but the country has dangers as well, so the city preponderance in Accidents and Injuries rises no further than 2.9. The immoral allurements of city life do not assume high importance, as far as *death-rates* or preponderances are concerned, due largely, no doubt, to the fact that dissipation in most cases first weakens the vitality, after which other complications set in, to which the death is

ascribed.* In proportion to the size of the death-rates, however, the city preponderances of 0.5 in Venereal Disease and of 5.8 in Alcoholism are very large. Westergaarde's theory, that cities save female life during the child-bearing age, is apparently disproven, for the city shows a higher female death-rate than the country in diseases connected with pregnancy and in diseases of the urinary and sexual organs, the city rate being 3.1 higher in the former case and 39.0 higher in the latter. In fact, the *country* seems to be such a saver of female life from diseases of the urinary and sexual organs that, while the city death-rate for this class is 24.9 higher than the country rate among *males*, it is 39.0 higher among females. Of course, the registration area takes in practically none of the newer agricultural regions, so that as between these and city life Westergaarde's position may be correct.

Willcox, in his Census Bulletin on Mortality, suggests that the male sex may be endowed with less vitality than the generally supposed "weaker sex."† If this be true, the weakness manifests itself most evidently through the medium of pneumonia and consumption especially. Whether the fatality of these diseases is a sign of inherent weakness or of increased exposure is worthy of closer inspection.

Table V presents the classified occupations of males in the United States as given in the Census of 1900.‡ Opposite each class and occupation is the death-rate per 100,000 male population from consumption and from Diseases of the Respiratory System. Where females are engaged in the same or similar occupations, the female death-rate from these causes is likewise put down.

* Families of the deceased influence the physician to conceal shameful causes of death.

† "For the differences in the death-rates of the sexes in infancy, when such social causes as greater exposure of males to dangers of all sorts are absent, other than social forces must be appealed to for explanation." Willcox, p. 725.

‡ Part I, *Vital Statistics*, p. cclxii.

TABLE V.

OCCUPATIONS IN RELATION TO CONSUMPTION AND DISEASES OF THE RESPIRATORY SYSTEM.

Rates per 100,000 Respective Population. (Registration Area.)

(Vol. I, *Vital Statistics*, Census 1900, p. cclxii.)

OCCUPATION.	Consumption.		Respiratory Diseases.	
	Male.	Female.	Male.	Female.
<i>Professional Class</i>	182.2	—	187.1	
1. Architects, Artists, etc.	188.9	—	102.1	
2. Clergymen	123.5	—	340.7	
3. Journalists	188.4	—		
4. Lawyers	139.9	—	178.4	
5. Musicians	349.8			
6. Physicians	168.8	100.2*	243.0	121.7*
7. Teachers	144.0	126.1	144.0	61.9
8. Clerical and Official	304.2	—	167.7	
9. Book-keepers and Clerks	398.0	198.0	173.3	64.7
10. Bankers, Brokers, etc.	92.1	—	142.7	
11. Collectors and Agents	181.2	—	144.7	
<i>Mercantile</i>	165.8	—	167.0	
12. Pharmacists	305.5	—	230.9	
13. Merchants	163.8	—	216.7	
14. Pedlars, etc.	250.9	—	143.3	
15. Public Entertainers	268.5	—	194.5	
16. Hotel and Boarding-house Keepers	210.3	—	255.4	
17. Saloon and Restaurant	285.6	—	176.7	
18. Police and Military	254.8	—	179.7	
19. Barbers, etc.	334.9	—	107.5	
20. Janitors	251.4	—	359.1	
21. Police, Watchmen, and Detectives	136.7	—	213.2	
<i>Laboring</i>	376.0	—	313.2	
22. Laborers	370.7	—	323.5	
23. Servants	430.3	319.7	222.5	222.6
<i>Industrial</i>	262.1	—	181.2	
24. Bakers and Confectioners	250.1	—	155.7	
25. Blacksmiths	212.9	—	227.0	
26. Boot and Shoe	135.5	—	120.0	
27. Brewers, etc.	256.8	—		
28. Butchers	287.7	—	201.8	
29. Cab. and Upholsterers	359.1	—	181.6	
30. Carpenters	231.0	—	191.5	
31. Cigar and Tobacco Workers	476.9	—	312.7	
32. Printers, etc.	435.9	—	154.5	
33. Coopers	399.5	—		
34. Engineers (Stationary)	229.7	—	212.9	
35. Iron and Steel Workers	236.2	—	224.7	
36. Leather Workers	227.3	—	97.4	
37. Machinists	195.9	—	141.9	
38. Marble and Stone Cutters	540.5	—	201.7	

* Includes female nurses and midwives.

TABLE V.—*Continued.*

OCCUPATIONS IN RELATION TO CONSUMPTION AND DISEASES OF THE RESPIRATORY SYSTEM.

Rates per 100,000 Respective Population. (Registration Area.)

(Vol. I, Vital Statistics, Census 1900, p. cclxii.)

OCCUPATION.	Consumption.		Respiratory Diseases.	
	Male.	Female.	Male.	Female.
<i>Industrial (continued):</i>				
39. Masons	293.9	—	311.1	
40. Textile Factory Hands	207.6	144.1	107.4	46.8
41. Millers (Flour, etc.)	198.5	—	297.8	
42. Painters and Glasiers	319.3	—	190.9	
43. Plumbers	294.0	—	123.0	
44. Tailors	218.0	130.1	159.8	66.1
45. Tinnors	365.3	—		
<i>Agricultural, Transportation, and Outdoor .</i>				
46. Boatmen	147.2	—	181.5	
47. Draymen, Hackmen, and Teamsters	256.8	—		
48. Farmers and Farm Labor	261.4	—	170.3	
49. Gardeners, Nurserymen	111.7	—	198.0	
50. Liverymen	186.6	—	230.3	
51. Lumbermen	267.5	—	141.4	
52. Miners	107.1	—	122.3*	
53. Sailors	120.9	—	102.8	
54. Railroad Men	333.0	—	310.0	
	129.8	—	79.5	

It will be noticed that the death-rate for the Professional class from consumption is 182.2; for the Mercantile class, 165.8; for the Laboring and Servant class, 376.0; and for the Manufacturing and Industrial class, 262.1; for Agriculture, Transportation, and the general Outdoor class, only 147.2. For the strictly rural classes, farmers and lumbermen, the rate is still lower,—only 111.7 and 107.1, respectively. Only one of all the fifty-four mentioned occupations has a lower death-rate from this cause than farmers. Bankers and brokers who can afford the most sanitary homes, frequent vacations and travel for recuperation, and the very best medical care that the times offer, have a death-rate from consumption of 92.1. Their clerks and book-keepers, at the same time, have a death-rate from this cause of 304.2 and 398.0, respectively. Thus it would seem that indoor life is particularly favorable

* Pneumonia alone.

to a high death-rate from consumption. The fact that women in the country have a higher death-rate from consumption than men, though lower than the city female death-rate from this cause, bears out the conclusion (See Table IV). To be sure, sailors have the high rate of 333, but their case is obviously exceptional. Boatmen are in a similar class. Gardeners and nurserymen seem to be somewhat of an exception, but their rate of 186.6 pales into insignificance when compared with 540.5, the death-rate from consumption for stone-cutters, the 435.9 for printers, the 430.3 for servants, and the 476.9 for tobacco workers.

But, if indoor life is conducive to consumption, should not the women be as subject to consumption as men? which is not the case. Women are not, however, subject to the *same* indoor conditions as men. If we compare men and women in the same occupations, we find that in each instance the female death-rate is much lower (of physicians, teachers, book-keepers, servants, and textile workers,—numbers 6, 7, 9, 23, 40,—Table V). This may indicate that women are more able to withstand disease than men, but more likely these figures result from the different age composition of the sexes in these occupations. It is well known that most of the females in these occupations are young. They marry out of the occupation into homes before disease gets hold of them or before the disease is manifest, so the occupation is not charged up with the death. Of the reported deaths in the registration area, 75.6 per cent. of the male decedents had gainful occupations against 13.5 per cent. of the female decedents.* Consequently, a comparison between men and women under similar conditions must be a comparison between men in the office, shop, and factory, and women in the home. The city home may not be of the best, but it is not open to as much contagion as the factory; it has no such dusty air as the factory; it remains the same from year to year, so that the wife becomes physically adjusted to it. Neither is she subject to the exposure to change which results from going from a hot, stuffy factory into a cold, windy

* Census 1900, *Vital Statistics*, Part I, p. cclix.

street. So the conclusion is that indoor occupations account in a large part for the high excess of male mortality in the city resulting from consumption.

The case for Diseases of the Respiratory System is not so clear. It will be remembered that from this cause there is a city preponderance of 40.2,—something over half as large as consumption. In the rural districts the male and female death-rates are nearly equal, being 136.9 and 134.8 respectively (See Table V). While in the city there is a wide discrepancy, the rates being 252.4 and 214.6 respectively. The city preponderance is due, then, to one of two things, either that the country is extra severe to women or that the city is extra severe to men. The latter seems to be the case, for the city is more severe on women as well as on men, having a female pneumonia death-rate 79.8 higher than the country (See Table IV, cf. cols. 2 and 4). This situation is only accentuated in the case of men, the city rate being 115.5 higher than the country rate (*Ibid.*, cf. cols. 1 and 3). We must look within the city, then, for the conditions that bring about the male excess.

If we compare the male death-rate from this cause with the female death-rate in the same occupations, as was done before (See Table V), we find that in each case, except servants, the male rate is much the larger. These comparisons are rather more fair than in the case of consumption, for pneumonia, not being a slow disease, like consumption, is nearly as fatal to the young as to the middle-aged, and is more the result of immediate conditions than of long-continued conditions. Therefore, the age composition of the occupations would not have so much effect. Why women-servants should have such a high rate from Diseases of the Respiratory System is not apparent. It may be that, because they are in the homes of others, they do not receive sufficient care; while men-servants, on the other hand, in many cases have homes, and, in case they do not, the masculine propensity to give up work and to demand attention when an ailment is felt procures them help.

The greater indoor life of the city, while it seems to account for the high city death-rate from consumption, does not seem to

do so satisfactorily in the case of pneumonia. For, while the outdoor class of occupations has a rate of 181.5, the Industrial class is no higher (181.2), the Professional class is but little higher (187.1), and the Mercantile class is much lower (167.0). The Laboring and Servant class, however, has an enormously higher rate, 313.2. Table VI will indicate that this class is numerous enough to counterbalance with their high rate the somewhat low rate of the Mercantile class and to give the city the preponderance noted before. Farmers have a higher death-rate from respiratory diseases than the average of the outdoor class, their rate being 198. Indeed, of the fifty occupations with rates given, only eighteen had higher rates, while thirty-one had lower rates. These eighteen that are higher, however, are enough higher to not only counterbalance these thirty-one, but to make the city death-rate to males from respiratory diseases 156.6 higher than the country rate and 137.8 higher for pneumonia alone (See Table IV, cols. 1 and 3).*

TABLE VI.
NUMBERS OF MALES IN CLASSES OF OCCUPATIONS.
(Registration States.)

Agricultural	955,000
Labor and Servant	860,000
Professional	215,000
Mercantile	1,305,000
Industrial	1,899,000

Compiled from Census 1900, Occupations, Table 33.

In view of the fact that women have a much lower death-rate from respiratory diseases than men in most of the occupations where they share the same conditions, and considering that the age composition of the sexes in these occupations has but comparatively little effect, it must be concluded that men are more prone than women to these diseases from lack of constitutional vigor. Whether this lack of vigor results from an

* This is not *wholly* true. The deaths from pneumonia, etc., among males not in occupations probably has some effect.

inborn tendency or from the greater stress of masculine activity in both a business and a social sense cannot be answered here. The fact that women have a higher death-rate from these diseases in the city than they have in the country leads to an inference that the oft-mentioned artificiality, hustle and dash, and nervous strain of city life do have their weakening effect. And it may be that the greater strain, the more general exposure, and the more frequent dissipation of men in cities turn down ever so slightly the flame of their bodily vigor, a conjecture strengthened by the city preponderances, small though they be, in nervous diseases, suicide, venereal disorders, and alcoholism, so that the small degree of vitality which so often means the difference between life and death is wanting when a virulent malady like pneumonia assails. Again, it may be that Willcox is correct in his inference, previously mentioned, that women have greater constitutional resistance to disease. By some it is urged that the larger head of the male child weakens him at birth, and, though his rougher life in youth may bring him greater physical strength, it never restores the lost constitutional strength. The greater death-rate among male infants who share precisely the same conditions with female infants seems almost conclusive evidence that men begin life with a far greater susceptibility to bodily ailment than women.

To recapitulate the conclusions which have been suggested, it seems that a general deficiency of organic vigor in males (from whatever causes) results in a high male excess of mortality from pneumonia in cities; that, whether or not this deficiency in organic vigor lies at the basis of the much greater excess from consumption, city conditions attending indoor labor have a profound effect. These two diseases are of such prevalence as to bring about an excess of male over female mortality, generally higher in cities than in rural sections. This excess is roughly in proportion to the amount of city life, though it is affected by geographical environment.

THE USE AND MISUSE OF STATISTICS IN SOCIAL WORK.*

BY KATE HOLLADAY CLAGHORN.

The general theory underlying the use of the statistical method in social work is so plausible and attractive that few to-day would venture seriously to attack it. That every social condition is due to some cause or causes, that social remedies depend for their effectiveness on knowledge of causes, that this knowledge involves more or less investigation and examination are almost self-evident propositions, stated in this general way, and lead naturally to the employment of the statistical method as a form of research especially applicable where large numbers are to be dealt with, as in the case of social groups.

And so it happens that every phase of the growing interest in social conditions and social betterment is manifesting itself in the endeavor to produce its own appropriate form of social statistics.

Every matter on which legislation affecting social conditions is desired (and these are growing in number and extent day by day) is first referred for investigation, as a matter of course, to some committee or commission which, after laboring from six months to two years, produces its own bulky quota of columns and tables to be stacked away upon library shelves.

The official censuses, State and Federal, originally intended to be mere enumerations of the population, include, year by year, a wider range of facts bearing on social conditions.

Our great organizations of various kinds, public and private, dealing with the social group in its various subdivisions, as dependents, delinquents, defectives, and so on, are keeping more and more complete and careful records, to show not merely

* Read before the National Conference of Charities and Correction, Richmond, 1908.

administration efficiency, but also such facts as are thought likely to be of value in throwing light on the special problem involved in their work or even upon those of a more general nature.

And, finally, every settlement worker, every college boy and girl, filled with enthusiasm for "research" and "statistics," is roaming up and down the land, with open note-book and freshly sharpened pencil, to glean such precious spears of statistical fact as may have been passed over in the lumbering progress of the official machinery.

But, in this enthusiastic advance upon the shining fields of social research, how much have we looked behind, to note the value of the crop we have been gathering?

In some of the older lines of statistical inquiry the process of criticism has followed well after the progress of growth. In the methods of census investigations, in records of institutions, improvements are constantly being made that are constantly adding to the reliability and usefulness of the statistical results.

But outside of these boundaries, among the host of newcomers into the statistical field with a fresh idea for a statistical investigation for every day in the year, it seems as if the pre-occupation with each successive new scheme prevents any critical examination of those already brought to completion. These inquirers irresistibly remind one of fresh-air children on an outing, so entranced by the new riches before them that they grasp handful after handful, flowers and weeds together, only to drop them unregarded at the enticement of the next waving tuft of brightness.

There is, in particular, one branch of social inquiry in which there is especial activity at the present time and in which it seems there has been especially little taking account of what is really accomplished, and that is the investigation of the circumstances of the lives of the poor in their homes.

A favorite variety of this sort of investigation is that which concerns itself with the standards of living of families, as shown by the items of family income and expenditure or the family

budget. The difficulties of this kind of inquiry seem to be fairly well recognized in theory, but with apparently little effect in restricting the output in practice.

Every one to whom it would occur to make an attempt at statistical investigation at all is supposed to understand, as the very first principles of his work, that, in order to secure anything that may properly be termed "statistics," the matter dealt with must be capable of expression in quantitative terms, must consist of units that can be distinguished as like and unlike on some objective and verifiable basis, and that can be added, subtracted, and otherwise compared numerically. In the second place, information as to these quantities and relations must be accessible. In the third place, a sufficient amount of information must be gained to eliminate individual variations in the subject studied and errors of observation on the part of the investigator.

In social inquiry, generally, as compared with most other lines of research in which the statistical method is used, there is especial difficulty in meeting not merely one or two of these conditions, which might be counterbalanced by especially thorough compliance with the remaining one, but in meeting any and all of the three, owing to the number, obscurity, and complexity of the elements involved.

And this is especially the case in investigations of standard of living. Any one who has been behind the scenes of one of these investigations, and knows how the information is obtained, must indeed feel a sense of wonderment at its imposing array of columns, percentages, and averages which look so positive and convincing on the printed page.

In the first place, merely in arranging the concrete elements of the problem, the investigator has no end of difficulty in deciding upon the "units" that are to be counted. They must be distinct, they must always have the same meaning in the same investigation, and they must be significant. It is necessary to reduce all sorts and kinds of commodities to some common basis of kind and quality and price. The concrete articles of food must be divided into general classes and dis-

tributed by periods of consumption. Bare amounts paid for rental tell little unless something can be known of the accommodation secured. Clothing must be distributed by kinds and by periods of service,—a very difficult matter. The purchasing power of money ought to be taken into account, though it usually is not.

At last the schedule is planned, including many items the investigator has no direct or special use for at the time, but that he thinks are "interesting" and likely to throw unexpected light on the social problem when gathered, and now he goes forth to collect his information.

Difficulty number two is promptly met with,—that of the possibility of access to the information desired. He cannot, like the astronomer, make first-hand observation of his material which can be verified by other first-hand observers, but is obliged to accept the statements of other people—his very objects of study—who may be, and usually are, of differing degrees of intelligence, of willingness to tell the truth, and of differing personal bias which will lead some to understate some things and others to overstate them, and *vice versa*. They, in turn, are not giving information entirely at first hand, but must depend, more or less, upon memory for matters that puzzle anybody to recall definitely. And, finally, the investigator has to translate their concrete contributions of items into his "units," and present them in such shape and semblance of order as to afford ground for some definite conclusion about something large or small.

Now the third difficulty is encountered. Owing to the first two drawbacks, the scope of a budget investigation ought to be especially large to eliminate errors and give truly representative details. As a matter of fact, it is usually, on account of the time and labor necessary for its preparation, especially small. Data are usually gained for from one hundred to five hundred families,—a range entirely inadequate as a basis for conclusions.

In a recent investigation where it was frankly acknowledged that the number of families investigated (two hundred) was

too small to "furnish conclusive deductions for all workingmen's families," comparison was made with broader investigations to prove the general correctness of the one in question. It might be urged, however, that, where the small investigation is merely confirmed by the large one, it is unnecessary, and, where it is not confirmed, it is too small to allow us to determine whether it is showing new and typical phenomena or simply individual variations due to scarcity of examples.

Where it is found impossible (as it usually is) to make the complete enumeration of facts that would give the whole truth for a class, for workingmen in a given country, for instance, at a given period, or for a given income class, or race, or neighborhood, the investigator has to fall back upon a selection of examples that again works confusion.

In the investigation above referred to,* the two hundred families studied were found in one special neighborhood in New York City, but we are nowhere given definitely the principle of selection whereby, as the preface claims, "they were sorted out by a method as sound as could possibly be chosen," and consequently are unable to judge, except from the word of the investigator, whether the results of the investigation do or do not "give a comparatively true insight into the social, economic, and industrial life of a large class of workingmen's families in any city neighborhood of similar character."

As the actual group of two hundred families chosen included eight nationalities and eleven different sizes of family (ranging from two to twelve) with incomes ranging from \$200 to \$2,500 and occupations of great variety, including unskilled, skilled, and trading occupations, it is difficult to see how so small a group as a whole can be taken as a type, in all its diversity, of the "working" population as a whole, and still less how, even under proper classification and subdivision, to show the effect of variation in one condition at a time (as variation of income within one race-and size-of-family group, or variations of race within one income-and size-of-family group, or of size of families within the same income-and race-group), any

* More, "Wage-earners' Budgets," New York, 1907.

safe conclusion can be drawn from groups which in many cases are so small as to reduce to individual instances.

In the budget investigation just referred to, some attempt is made to so classify the material presented as to show income and expenditure according to the different elements involved, but we never succeed in getting only one variable at a time. If we have a classification showing variation in income-groups within one size-of-family group, the race elements are mingled indiscriminately, so that we cannot tell whether it is the grade of income reached (which is shown), or the different preponderance of different race elements in different income-groups (which is not shown where size-of-family and income-groups are compared) that is related to the expenditure.

In like manner, in another set of tables, the reader thinks he has arrived at some wise conclusion as to the effect of race traits on expenditure by comparison of different races within the same income-group, when he is suddenly brought to a standstill by observing that the different race-groups show different sizes of family, a circumstance which has its own separate effect on both the amount and the proportion of expenditure.

The inquiry into standards of living recently undertaken by the New York Conference of Charities and Correction avoided some of these defects by confining the investigation as nearly as possible to families of approximately the same size (which might be considered as the average type,—*e.g.*, father, mother, and three children), and within a small range of income so selected as to bring the families within the lower levels of what was assumed to be “normal” subsistence.

But this investigation succeeded in securing for detailed study only two hundred and thirty schedules, covering three income classes and eight race-groups.

Realizing the difficulties of the undertaking, the cautious investigator of budgets will disclaim any attempt at elaborate generalization, and will even, with studied modesty, claim to make none, offering his study as merely a bit of social history to be used by some one else who may find it helpful.

But it is interesting to see that these very investigators

cannot, after all, refrain from generalization; and some of the attempts at interpretation are rather amusing. To take one more instance from More's "Workingman's Budgets," the deduction is made in the final summary that "thrift seems to be most marked in nations in which the preponderance of the income is from the husband," on the basis of one table giving percentage of income derived from the husband and another giving the average surplus in families where there was a surplus shown, both by nationalities.

It occurred to the present writer that the amount of income per person for the families of different races might have something to do with it, too. For instance, Norwegians stood at the head of the list as to amount of surplus and also per cent. of income from husbands. But the group, as a whole, consisted of four families of an average size of 3.5 and an average income of \$1,171.75. Such families ought to show a surplus as compared with a group where the average income is \$850 and the average size of family 6.0. It might be objected that these very facts are closely related to the percentage of income from the husband, this growing naturally less as one goes down in the scale of prosperity.

To test this and to see also if the generalization was justified, let us arrange the race-groups in the order, respectively, of average income per person, of average surplus where a surplus existed, and of percentage of income from the husband, also giving the number of families in each group, to indicate the weight to be attributed to the facts they show, on the basis of the tables given in the report.

<i>No. of families.</i>	<i>Order according to average income per person.</i>	<i>Order according to average surplus.</i>	<i>Order according to percentage of income from husband.</i>
4	Norway and Sweden.	Norway and Sweden.	Norway and Sweden.
17	Germany.	Germany.	Switzerland.
2	Switzerland.	United States.	Austria.
15	England.	Italy.	France.
105	United States.	England.	United States.
4	France.	Switzerland.	England.
35	Ireland.	Ireland.	Italy.
15	Italy.	France.	Germany.
1	Austria.	—	Ireland.
1	Cuba.	—	Scotland.
1	Scotland.	—	Cuba.

Comparison of the middle column with the right and left hand columns, respectively, will indicate which generalization was the better founded. It should be recalled that irregularity in the correspondence between order according to average income and order according to surplus may be allowed, as indicating thrift as a purely race trait, aside from income; and the chief irregularities are explicable on that basis, notably for Italy, which has a race reputation for thrift.

In the right-hand pair of columns, however, the hypothesis on which they are founded leaves no room for irregularity in order. As a matter of fact, the correspondence fails after the very first item. Omitting race-groups where the number of families is less than four helps matters somewhat; but even then the correspondence is not close, failing notably for the Germans and French.

But, after all, what is the value of these studies without some generalization? What is looked for in these inquiries into standards of living is something beyond mere bits of social history. The chief inducement for taking up social research is to get some light on social causation or, at least, social tendency; and, in particular, circumstances of life should be related to the well-being of the family. It is not enough to get bare items of income and expenditure. We want to translate them into terms of well-being. This task may be approached in various ways.

The mere fact of survival on a given income is a test of the minimum degree of well-being, or, rather, one should say, of a certain degree; for it may be questioned whether those persons who are actually wiped out by death are of as much concern to society at large as those who drag their lives along through various stages of physical and moral disability.

That a family can barely survive on \$500 a year can be learned in a simpler fashion than by a budget inquiry; what we really want to know is what grade of well-being that amount can secure, and under what conditions.

Certain approaches to this problem may be made statistically. For instance, we can reduce the amount of money spent

for food into its main kinds, with the amount of each. Then we can, by analysis, determine the general nutritive value of this food per person, per day.

This additional step was wisely taken in the investigation by the New York Conference. But they were unable to determine the amount actually consumed, which would be the next stage of approach to the question of well-being. This, of course, could be determined statistically, though it would not be easy to do so.

But for the next stage we should know what effectiveness is given to food by its preparation, which depends upon different degrees of ability in the housewife; then how the individual members are able to make use of it, which depends upon various idiosyncrasies, involving the uncalculated forces of heredity as shown in race differences, inherited constitution, etc.; and, finally, the degree of well-being reached by its use.

To these questions the statistical method to date does not give reliable answers, and perhaps never will; but the want of them vitiates the whole process of budget investigation to a great degree.

The skill of the housewife, which no way has been found as yet to measure statistically, is as important an element in the problem as any of those that can be so measured. And this is true not merely in the preparation of food, but in the direction of all expenditure. How are we to get track of this? Most investigators agree on the great importance to be ascribed to this element, but can only give information about it in general terms. It does little good to be told (as in one instance) that "what is done with the weekly income and the amount of comfort it yields depends almost entirely upon her [the housewife's] character and ability," when the statistical tables from which inferences are to be drawn are made up entirely without classification of this most important variable, and when we are unable to deduce it from the items themselves. For it is obviously incorrect to assume that good management is proved in families in low income grades if they survive, or in higher grades, if they show a surplus of income over expenditure at the end of the year.

A more sensible test would be that of the grade of well-being of the family, which is also wanted for its own sake, as the final end of a budget investigation. But that, too, is difficult, if not impossible, to get statistically. It is not necessary to adduce elaborate proof of this point. Let any one who doubts the difficulty set to work to draw up a schedule to show degrees of physical well-being, and then consider how the information is to be secured and how accurate it is likely to be.

Or, to save labor, let him consult the Report of the New York Committee on Physical Welfare of School-children,* which did attempt to connect circumstances of life with well-being by the statistical method, and see what results are obtained.

That committee, reversing the process of the budget investigator, took a grade of well-being as its starting-point, and attempted to trace back to the circumstances of home life which might have caused it. Fourteen hundred school-children in the kindergarten and first two grammar grades, of different nationalities, from schools in all parts of the city, who were found by the school physicians to have defects of vision, hearing, breathing, teeth, and nourishment, were taken as the basis of the investigation, which consisted of inquiry into their home conditions "in order," the report states, "to ascertain whether their need arises from deficient income or from other causes."

At the very outset the test of "well-being" is seen to be a most uncertain one. While, at first glance, the idea that two-thirds of the city's school-children are physically "defective" is a startling one, it depends, after all, upon the kind and degree of the defects how serious the condition is. The kinds of defects included in the class investigated by the committee are precisely those in which the degree of importance may vary most widely and is likely to be differently judged by different examiners.

The main items of defect shown in the fourteen hundred children studied were malnutrition, enlarged glands, eye defects, nose defects, throat defects. The largest single item was for "bad teeth," which was present in 74.9 per cent. of the

* Report on Physical Welfare of School-children. Pub. Am. Stat. Assn., June, 1907.

fourteen hundred children. This is obviously a defect as to the significance of which there may be great difference of opinion. Those who hold that it is of especial importance in its bearing on malnutrition and other defects will not get much support from the relation of defects shown in this report, as, in the 145 cases of malnutrition found among the 1,400 children (only 10.4 of all), only 73.1 were reported as having bad teeth; while the remainder not afflicted with malnutrition showed 75.1 with bad teeth. In fact, 291 of the children (21 per cent. of the 1,400) had no defects *but* bad teeth. Suppose we decided that "bad teeth," unaccompanied by any other defect, was not a very alarming condition, and subtracted the number showing that defect only from the defective class. Doing this and assuming that the 1,400 children with defects showed the ratio to children without defects given by the school authorities as 2 to 1, it is found that the proportion of "defective" children in the school population would drop to 53 per cent., which is quite a different story from 66½ per cent.

In like manner the other items could be varied and the percentages changed. That there is a grave possibility of change in degree of defects, due to differences in examination, is more than hinted at in the report, where a comparison is made between the percentage of defects shown in the first examination of 1,400 children in October and in a re-examination of 990 of the same children in the following March and April. The remaining 410 had moved away,—a selection of sufficiently random character not to affect the proportions, which were as follows:—

	<i>First examination, per cent. of 1,400 children.</i>	<i>Second examination, per cent. of 990 children.</i>
Malnutrition	10.4	12.9
Enlarged glands	45.5	70.2
Bad teeth	74.9	79.2
Eye defects	14.9	17.4
Nose defects.	28.2	47.1
Throat defects	30.9	45.6

"Almost to a child," says the report, "conditions were found to be more serious in April than were recorded in the preceding October, November, and December." But "no one knows,"

the report continues, "whether these changes are due to actual deterioration or to the probability that a school physician, re-examining specially selected children, would be more thorough than when making original examinations. No allusion is here made to seasonal change, but this also would have to be taken into account."

Whatever the reason, it would seem that percentages which could vary so widely as from 45 to 70 for "enlarged glands," from 28 to 47 for nose defects, and from 30 to 45 for throat defects in six months, would be of little value either to show prevalence of defects or to make a basis for showing their causes.

As a matter of fact, the results of this research were mostly negative, as practically admitted by the committee themselves, due, however, not merely to the indeterminate character of the class taken for investigation, but to serious defects in method, which could, it seems, quite well have been avoided.

In the investigation of home conditions a large number of questions was asked, covering race, time of residence in New York State, in the city, income, occupation, members of the family working, kind and number of rooms occupied, rent paid, character of meals eaten by the child in question and his hours of sleep, disease and death record of the family, with record of circumstances accompanying the birth and infancy of the child, and many other matters.

The material thus obtained was embodied in thirty-eight tables of great length and detail, in comment upon nearly every one of which, one after another, the report itself states that the particular circumstance there tabulated did not seem to account for the defects.

This is not surprising when it is seen that not one of these tables gives comparisons with the same set of conditions for the school-child without defects, to see whether the circumstances shown are in a differing proportion for the defective child, and consequently may be presumed to have some relation to the defects.

In only four of the thirty-eight tables are the different defects tabulated separately. Of the remaining thirty-four,

twenty-two give classifications of circumstances of home life by race, nine by income, and three by both race and income for the class of defectives as a whole.

If this were a study of race traits and habits or of variations in manner of life characteristic of various income-groups, the tables would be to the purpose. But, after uniting heterogeneous defects in one arbitrary class and failing to give any standard of comparison with the normal child, in what possible way can the diseases and mortality of fathers and mothers, number of children born, mortality and diseases of children, housing conditions, income, etc., be shown to have relation to the defects given?

The nearest approach to a positive result is obtained from a couple of tables where malnutrition is tabulated separately and compared with the other defects, for several circumstances, income among them. Here we have some indication of circumstances that are presumably related to this one defect; but how much more light would have been thrown on even this one question, had the basis of comparison been, not children with other defects, but the average child, or, even more significant, the child without defects.

This lack could have been easily supplied for all the tables, and the value of the report increased tenfold, by making a parallel investigation of home conditions for seven hundred families in which the school-children showed no defects; that is, the remaining one-third, which is said to be the proportion of those without defects among New York City school-children.

Such an investigation, after all, is but a crude method of finding the causes of physical defects. Each defect may be the result of one of many coexisting circumstances or of any variety of combination of these circumstances; and each may in its turn interact with any of the others in a way that requires the utmost patience and nicety of physiological research to disentangle, taking up one defect at a time and one supposed cause at a time. Perhaps as long as this is the case it would be advisable for the lay investigator to leave such questions for the medical profession to solve.

Are the results gained in such inquiries undertaken under such difficulties as these worth the time and money spent on them? The most that budget investigations have determined, even if we assume them to be accurate, is that *some* people *can* live on a certain amount of money at a given time and place; but they seldom afford a guide as to what other people *can* or *ought* to do. The budget inquiry of the New York Conference was undertaken with the eminently practical purpose of throwing some light on the question of adequate relief, by showing how much money we ought to assume would be sufficient for a family to live on in a fairly normal way.

The conclusion drawn, however, is from an average based upon different race-groups, each of which presumably differs from the others in respect to the fundamental necessities of normal living. For this purpose, indeed, the statistical method is especially weak, for it is a characteristic of the average not to fit individual cases.

The discrepancies shown in the different estimates that have been made of the minimum living wage indicate the difficulties of getting at the standard of living by means of statistics. And this, quite leaving out of the question the variation in purchasing power of money between one period and another and one locality and another, which of itself introduces an element of uncertainty so great that as a guide to practice a budget investigation is out of date about as soon as completed, and inapplicable besides to other communities than that for which it was taken.

Are there, besides the lack of results, certain possibilities of actual harm in the present wholesale recourse to this form of inquiry? It always does harm to give out misinformation in the guise of information, and matter presented in the form of long columns of figures has in itself a convincing look. People in general will not criticise or even read statistical matter, but they are, notwithstanding the numerous jokes about statisticians and liars, tremendously impressed by it. This is what makes the irresistible tendency of the investigator to generalize on insufficient basis so dangerous.

The general public will, without question, swallow almost any positive statement, accompanied by figures, without stopping for one moment to see whether there is any connection between the two or not. This is particularly mischievous when the public thus impressed is some legislative body, for we know that even they do not always give the "statistics" submitted to them a thorough critical examination, and that they, to a greater extent than the general public, are able to carry out their mistaken ideas in action which affects the entire community.

There is another possibility of harm of which it is perhaps old-fashioned to speak, and that is the effect on the families themselves of having their lives and intimate family circumstances investigated. These inquiries are in the main carried on, not merely from pure scientific interest, but for some purpose of social betterment; and it is not so very long ago that persons with such purposes were warned over and over again by their guides and advisers of the dangers of invading the privacy of the home and the necessity of keeping strictly within the limits of confidence, kindness, and personal relation in the work of investigation, which was to be tolerated only in so far as it was a necessary means for securing the benefit of the family itself.

The newer tendency in social work to regard outer circumstances of environment—such as food, housing, etc.—as the mainly determining factors in social conditions is for the time leading us to overlook the no less important side,—that of individual character, the force that reacts against environment and develops by laws of its own from within as well as those laid upon it from outside.

If, then, in our attempt to get at outer conditions we hurt or injure this delicate root of the inner life, are we not doing a very great and real harm? Self-respect is the foundation of character, and self-respect is accompanied by an instinct for privacy, which we should not only refrain from breaking down where it exists, but should try our best to build up where it does not exist.

If we, as housing reformers, insist upon separate entrances to bedrooms, so that different members of the same family shall not intrude on each other, shall we, as statisticians and strangers, ourselves break open those doors and with pencil and note-book in hand extract the most intimate details of the family life for public presentation?

The old-fashioned treatises on ethics taught us that the most immoral procedure possible toward our fellow-man was to treat him as a "thing," not a person. It would be very unfortunate, it seems to me, if, in our zeal for investigation, we conveyed the impression to the poor that they were "things" to be weighed, measured, and ticketed.

They have enough to bear. Let us at least spare them that, except where we are very sure that some very great benefit to them and to society at large will result from it. If the statistical mind needs exercise, it can easily get it in some more innocent way; and, if our college professors must provide their students with so-called "laboratory work" in social research, let it be among the well-to-do whose lives also might furnish statistics of an interesting nature and who are now showing such an interest in social investigation that they ought to be pleased to furnish the material for investigation as well as the funds.

To improve the conditions at present prevailing in social research, several measures can be taken.

In the first place, we should break off the habit of referring every question to statistical investigation as a matter of course. We should in the first place determine whether it is not sufficiently plain in its obvious aspects, so as to avoid resorting to a laborious process of proof of something quite well known before. Then it should be made quite certain that the matter in question is susceptible of statistical treatment. Then, whether the results will be worth the time and money spent in getting them. The student of social matters may ask questions enough in half a day, all of more or less interest and all abstractly capable of solution by statistics, but of such a nature as to keep an army of investigators busy for years.

If a question is handed over for statistical treatment, sufficient time and money should be allowed to make the results worth while. One great difficulty at present with statistical studies is that so many are of such small scope and not comparable with each other. Investigators seem to think that, by acknowledging that the extent of their investigations is inadequate, they have thereby obviated the difficulty. But they have not, so long as they continue to publish these investigations, nevertheless, and to draw conclusions from them.

What would perhaps be as wholesome a remedy as any for inadequate statistical work would be for those undertaking it to cultivate the old-fashioned moral virtue of self-denial. It is to be suspected that many an investigation is published just because the investigator has got the material together, and, although he knows it is inadequate, dislikes to waste it, or because some committee has paid him to produce results, and he wants them to feel that they are getting their money's worth. This idea itself should be combatted not merely for the sake of getting better statistics, but for the education of the public. It has been recognized as the duty of the statistician to urge the value and necessity of adequate and proper statistics; but it is quite as important and necessary a task—perhaps more so, at the present juncture—to stand firmly against the production of what is useless and misleading, and to make plain that the money appropriated for an investigation is better spent when the results are withheld if they prove to be negative or valueless than if they are “saved” by being published.

It is obvious that there is need of a better technique in the presentation of social statistics. There is no excuse for slovenly tables that even the expert must take a week to study out and that the ordinary reader can make nothing of except what the investigator gives him in his “deductions.” This is entirely unnecessary. In almost every matter dealt with in social research the material can be so arranged and explained that the average man may and should find it illuminating and instructive.

One reason for this lack of clearness in presentation is the

fact that so many untrained persons are engaged in this work. When an investigation is undertaken, the workers are gathered from hither and yon, as best they may be, some with one qualification, some with another, including some who seem to think it an interesting trait that they "don't like mathematics" and that they "always did hate to add."

It is, of course, possible to make use of untrained assistants under competent supervision; but I regret to say that even the directors of investigations are not always as careful in their own statistical methods as they might be, and do not always give really conscientious, careful supervision to their workers. Many an investigation is carried on and the results published under the guarantee of some statistical authority of weight or some committee of experts, in which the inexperienced and often untrained investigator is left very much to his own devices to form his own plan, frame his own tables, and draw his own conclusions without that careful, critical examination on the part of his chief which is his due.

Finally there is need for the development of new technical methods suitable for social research. The mathematical experts, with their elaborate formulæ, are as a rule not sufficiently interested in social questions, nor do the methods worked out for other sciences apply to most of the questions the social investigator wants to study.

The social scientist, on the other hand, is apt to be deficient in the mathematical sense as to where numbers apply and where they do not. What is needed is a new variety of expert, one who has at the same time the sense of numbers and the sense of social values. Let us hope that, by dint of each one doing his little best at the task of improving methods, a fitting type of method and of investigator will finally appear.

STRIKE STATISTICS.

BY IRA CROSS.

Since its establishment the United States Bureau of Labor has issued four reports dealing exclusively with the statistics of strikes and lockouts.* The data which they contain have been interpreted by many writers in a number of different ways and with varying results. Whenever a writer upon the labor problem has wanted to say something about strikes and lockouts, it has been customary for him to take up one of the above volumes, glance through it hastily, pick out a few general averages for the period covered by the investigation, and then publish those averages as accurate conclusions, good for all times, past, present, and future, and for the whole field of strikes and lockouts. Averages covering one period of years, *e.g.*, the average number of establishments per strike for 1881-95, have been compared with those of another, *e.g.*, the average number of establishments per strike for 1881-1900. The worthlessness of such a use of statistical data is too evident to warrant argument. Another method frequently followed has been to divide the tables into periods of four or five years, and then to compare the results of one period with those of another. Thus it has been claimed that the statistics contained in Table I, in which the number of strikes is grouped into five-year periods, show that strikes in the United States remained practically stationary from 1886 to 1895 and that

TABLE I.
NUMBER OF STRIKES BY FIVE-YEAR PERIODS.

1881-85	2639	1891-95	7169
1886-90	7029	1896-1900	6951

- * Third Annual Report, Jan. 1, 1881-Dec. 31, 1886 6 years.
 Tenth Annual Report, Jan. 1, 1887-June 30, 1894 7½ years.
 Sixteenth Annual Report, July 1, 1894-Dec. 31, 1900 6½ years.
 Twenty-first Annual Report, Jan. 1, 1901-Dec. 31, 1905 5 years.

from 1896 to 1900 they actually decreased, although during the same period, 1886-1900, population and the number of wage-earners in the manufacturing industries had greatly increased. Professor T. S. Adams, in an excellent chapter on Strikes,* follows this method, and states that, "since 1886 at least, strikes have not been increasing as fast as the population of the country. . . . Thus between 1890 and 1900 the general population increased 20.7 per cent., . . . and the wage-earners in manufacturing industries 25.1 per cent. On the other hand there were more strikes in 1890 than in 1900, and the average annual number of strikes in the five years 1886-90 was 1406 as compared with 1390 for the years 1896-1900. . . . Taking one year with another, there is no reason to distrust the plain testimony of the figures that strikes are not increasing as rapidly as the industrial population." But, on the other

TABLE II.
NUMBER OF STRIKES BY FOUR-YEAR PERIODS.

1881-84	1846	1889-92	5923
1885-88	4419	1893-96	4895
1897-1900	5710		

hand, if the statistics in Table I are grouped into four-year periods, as in Table II, a decided increase is to be noted in the last period, 1897-1900. Again, if the statistics covering the five years from 1901 to 1905 be added to Table I, as in Table

TABLE III.
NUMBER OF STRIKES BY FIVE-YEAR PERIODS.

1881-85	2639	1891-95	7169
1886-90	7029	1896-1900	6951
1901-1905	13,964		

III, we note that the number of strikes increased to 13,964 as compared with but 6,951 for the period 1896-1900. Thus we see that the number of strikes had practically doubled, although during the same period the wage-earners in the manufacturing industries had increased but 16 per cent.† If we compare the

* Adams and Sumner, "Labor Problems," pp. 179-181.

† Special Report on Manufactures, Bureau of the Census, 1905, Part I, p. lxxi.

actual number of strikes by individual years, we find that there were more strikes in 1905 than in 1900. Without further comment it is evident that such statistical methods are practically worthless.

Mr. G. G. Huebner has shown the fallacy of such methods in an interesting monograph, "The Statistical Aspect of the Strike,"* in which he has analyzed the data contained in the Sixteenth Annual (1900) Report of the United States Commissioner of Labor. In part he points out, as Bowley† had previously shown regarding the statistics of exports and imports, that the results obtained by grouping data by periods depend "upon the particular number of years adopted as the basis of the averages," and concludes that "no method which depends upon the particular period chosen as the basis of the averages can be adopted, as there is no more logic in adopting one period than another."‡ Thus, as shown above, if the strike statistics for the period 1881-1900 are grouped into four-year averages, the number of strikes per period increases, but, if a five-year average is used, the number of strikes per period decreases. In order to avoid this fallacy and at the same time to prevent the great fluctuations in the curves which would follow, were the absolute statistics of strikes plotted by years, Huebner adopts the method known as "smoothing," and uses a five-year average as the basis of his work. This results in a curve which avoids extreme fluctuations and at the same time indicates the general tendency in the development of strikes.

After a detailed analysis of the data at hand, Huebner concludes that for the period 1881-1900 statistics show that absolutely strikes were increasing rapidly, although relatively they were increasing slowly. As regards the effect of tradesunionism upon strikes, he affirms that on the "basis of the number of strikes the effect is to check the increase as tradesunionism becomes older and more experienced; on the basis of the number of employees and establishments affected by strikes, the

* Twelfth Biennial Report, Wisconsin Labor Commissioner, Part II.

† Bowley, "Elements of Statistics."

‡ Huebner, p. 82.

effect is to accelerate the increase. The character of the strike is being changed by the union so that it is becoming of increasingly wide-spread importance to both parties and to the community at large. . . . Union strikes are not becoming more successful even though unionism is being more and more thoroughly organized. . . . Furthermore tradesunionism affects the causes of strikes by reducing the importance of the purely standard causes [wages and hours] and increasing the importance of tradesunionism [closed shop, union rules, etc.] as a cause of strikes."

Since the publication of Huebner's results, the Twenty-first Annual Report of the United States Commissioner of Labor has been issued. It will be the object of this paper to examine the data contained in this volume, and by following Huebner's methods to see how nearly later statistics tend to confirm his conclusions as well as those of other writers.

In the tables and charts which follow, all data have been "smoothed" by using five-year averages. In order to get an average for 1882 and 1904 respectively, statistics for 1882, 1883, and 1884, and for 1903, 1904, and 1905, have been smoothed by three-year averages. Since the use of a three-year average in beginning and completing a five-year average curve might be seriously questioned, no importance has been given to the averages for 1882 and 1904 in arriving at any of the conclusions contained in this paper.

Before entering upon a discussion relative to the increase or decrease in the number of strikes during the years 1881-1905, it is advisable to consider the changes in the nature of the causes of these disturbances. The report of the Commissioner groups the causes of strikes into the following fourteen general divisions, with a subdivision under each, the latter giving the number of strikes in which each cause was but a partial or contributing factor:—

1. For increase of wages.
2. Against reduction of wages.
3. For reduction of hours.

4. Against increase of hours.
5. Concerning recognition of union and union rules.
6. Concerning employment of certain persons (not involving union rules).
7. Concerning employees working out of regular occupation.
8. Concerning overtime work and pay.
9. Concerning method and time of payment.
10. Concerning Saturday part holiday.
11. Concerning docking, fines, and charges.
12. Concerning working conditions and rules (not involving union rules).
13. In sympathy with strikers and employees locked out elsewhere.
14. Other causes (not above specified).

Only those strikes ordered because of (1) wages and hours, (2) union rules and recognition of the union, and (3) sympathy, need concern us here, because of the fact that the number of strikes called for reasons other than these fluctuated but little.

In order to obtain statistics of strikes that were declared because of wages and hours, the number of strikes called "For an increase of wages," "Against a reduction of wages," "For a decrease of hours" and "Against an increase of hours," have been added to those in which wages and hours were "only partial or contributing causes." Under the heading "Union Rules, etc.," have been grouped those strikes declared because of various matters "relative to dealing with union officials and the adoption or enforcement of rules and regulations of unions governing the work of their members, one of the most frequent and important rules being against working with non-union men,"*—or the closed shop. To these have been added those in which union rules were only a partial or contributing cause. The phrase "Sympathetic Strikes" needs no explanation. Strikes in which sympathy was only a partial cause have also been added. The results thus obtained are presented in Table IV and Diagram I.

* Twenty-first Annual Report, United States Commissioner of Labor, p. 113.

TABLE IV.

PERCENTAGE OF STRIKES DUE WHOLLY OR PARTIALLY TO CERTAIN CAUSES.

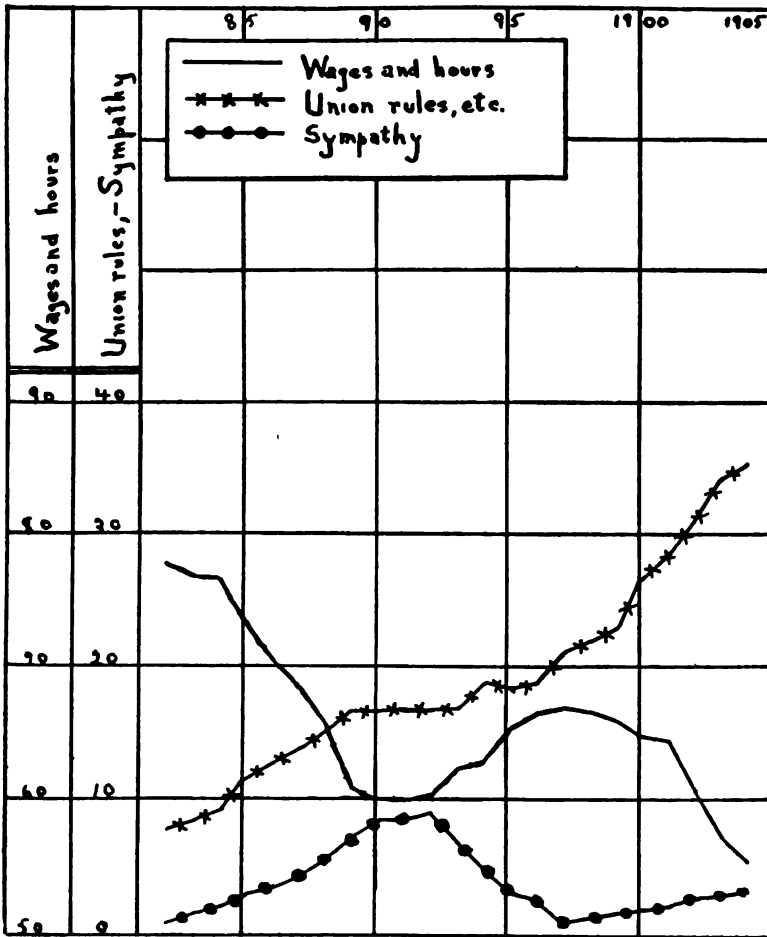
Years.	Wages and hours.		Union rules.		Sympathy.	
	Per cent.	Smoothed.	Per cent.	Smoothed.	Per cent.	Smoothed.
1881	79.0		6.8		0.8	
82	76.9	77.8	6.8	7.7	0.9	0.8
83	77.4	76.5	9.6	8.2	0.6	1.5
84	75.2	76.4	9.6	9.2	2.0	1.9
85	74.3	73.5	8.4	11.5	3.1	2.7
86	78.4	70.4	11.5	12.7	2.9	3.3
87	62.4	68.1	18.5	13.8	4.7	4.1
88	61.8	65.6	15.8	15.3	3.8	5.4
89	63.8	61.0	15.0	16.4	6.1	7.2
1890	61.6	59.9	15.6	16.4	9.9	8.0
91	55.2	60.0	17.4	16.6	11.5	8.2
92	57.3	60.2	18.3	16.4	8.9	8.7
93	62.1	62.1	16.8	16.6	4.5	6.9
94	65.1	63.0	14.1	18.6	8.8	4.7
95	71.1	65.3	16.5	18.1	0.6	3.0
96	59.4	66.4	27.1	18.8	0.6	2.3
97	68.7	66.8	16.2	21.0	0.7	0.8
98	67.5	66.4	20.3	21.9	0.8	1.0
99	67.1	66.0	24.9	22.9	1.5	1.4
1900	69.2	64.7	21.1	26.1	1.5	1.7
01	57.4	64.1	32.1	28.4	2.4	2.1
02	62.2	60.6	32.1	31.2	2.6	2.5
03	64.5	57.1	31.7	34.1	2.4	2.7
04	49.4	55.3	38.9	35.4	3.7	2.9
05	51.8		35.5		2.7	

It is interesting to note (1) the decline in the percentage of strikes called because of hours and wages and (2) the steady increase in the percentage of strikes called because of union rules. The decreasing importance of the one and the increasing importance of the other shows most conclusively that a decided change has taken place in the nature of the demands of the strikers. The Commissioner of Labor comments upon this matter in the following manner: "The percentage of strikes for an increase of wages . . . fluctuated from year to year, but the general tendency was downward. The percentage of strikes against a reduction of wages solely shows a tendency to decrease. The percentage of strikes due to recognition of union and union rules alone was 5.73 in 1881 and fluctuated from year to year, but generally

increased until the highest point, 32.42 per cent., was reached in 1904. That cause in combination with other causes also showed a decided increase during the twenty-five years from 1881 to 1905."* The agitation for the closed shop on the part of the unionist, especially since 1898, has greatly increased the number of strikes coming under this heading.

* Twenty-first Annual Report, United States Commissioner of Labor, p. 65.

DIAGRAM I. CAUSES OF STRIKES.



The slow but steady growth in the number of sympathetic strikes since 1896 is an interesting development. This has been due, no doubt, to an increasing number of strikes against performing work for other establishments in which a strike or lockout was pending or against furnishing material to such establishments.

In the following table the increase in strikes from 1881 to 1905 is shown in various ways. With the exception of 1882 and 1904, where, as previously mentioned, a three-year average is taken, the smoothing is effected by using a five-year average.

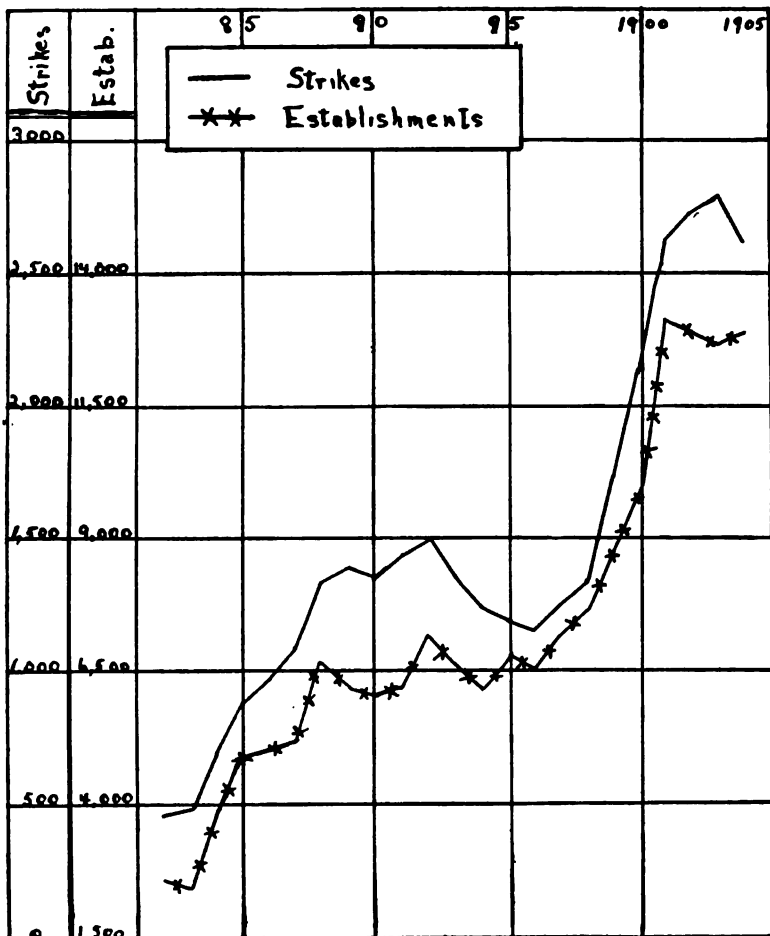
TABLE V.

INCREASE IN NUMBER AND MAGNITUDE OF STRIKES IN THE UNITED STATES, 1881-1905.

Years.	Strikes.		Establishments.		Strikers.		Employees affected.	
	Number.	Smoothed.	Number.	Smoothed.	Number.	Smoothed.	Number.	Smoothed.
			(000 omitted.)	(000 omitted.)	(000 omitted.)	(000 omitted.)	(000 omitted.)	(000 omitted.)
1881 . .	471		2.9		101.1		129.5	
82 . .	454	467	2.1	2.6	120.9	114.7	154.7	144.7
83 . .	478	498	2.8	2.5	122.2	124.0	149.8	164.7
84 . .	443	690	2.4	3.9	117.3	185.2	147.1	240.4
85 . .	645	887	2.3	4.8	158.6	215.6	242.7	285.4
86 . .	1432	972	10.1	5.0	407.2	211.8	508.0	285.1
87 . .	1436	1099	6.6	5.2	272.8	229.3	379.7	305.5
88 . .	906	1336	3.5	6.7	103.2	254.8	147.7	327.4
89 . .	1075	1393	3.8	6.3	205.1	222.4	249.6	285.5
1890 . .	1833	1366	9.4	6.1	285.9	200.5	351.9	251.0
91 . .	1717	1445	8.1	6.3	245.0	218.9	298.9	274.6
92 . .	1298	1500	5.5	7.2	163.5	278.9	206.7	356.8
93 . .	1305	1376	4.6	6.7	195.0	278.9	265.9	364.9
94 . .	1349	1238	8.2	6.1	505.0	266.7	660.4	353.3
95 . .	1215	1194	7.0	6.7	285.7	300.4	392.4	393.7
96 . .	1026	1145	5.5	6.6	183.8	297.8	241.2	390.2
97 . .	1078	1234	8.5	7.2	332.6	258.5	408.4	341.6
98 . .	1056	1347	3.8	7.7	182.1	281.3	249.0	364.2
99 . .	1797	1726	11.3	8.8	308.3	323.8	417.1	424.7
1900 . .	1779	2143	9.2	9.9	399.7	367.9	505.1	474.9
01 . .	2924	2681	10.9	13.2	396.3	437.8	543.4	556.1
02 . .	3162	2733	14.2	13.0	553.1	451.3	659.8	576.1
03 . .	3494	2793	20.2	12.8	531.7	406.7	656.1	519.7
04 . .	2307	2626	10.2	12.9	375.8	361.3	517.2	465.0
05 . .	2077		8.3		176.3		221.7	

The detailed statistics contained in Table V are summarized in Diagrams II and III. Diagram II shows that strikes increased

DIAGRAM II. CHANGES IN NUMBER OF STRIKES AND NUMBER OF ESTABLISHMENTS AFFECTED.



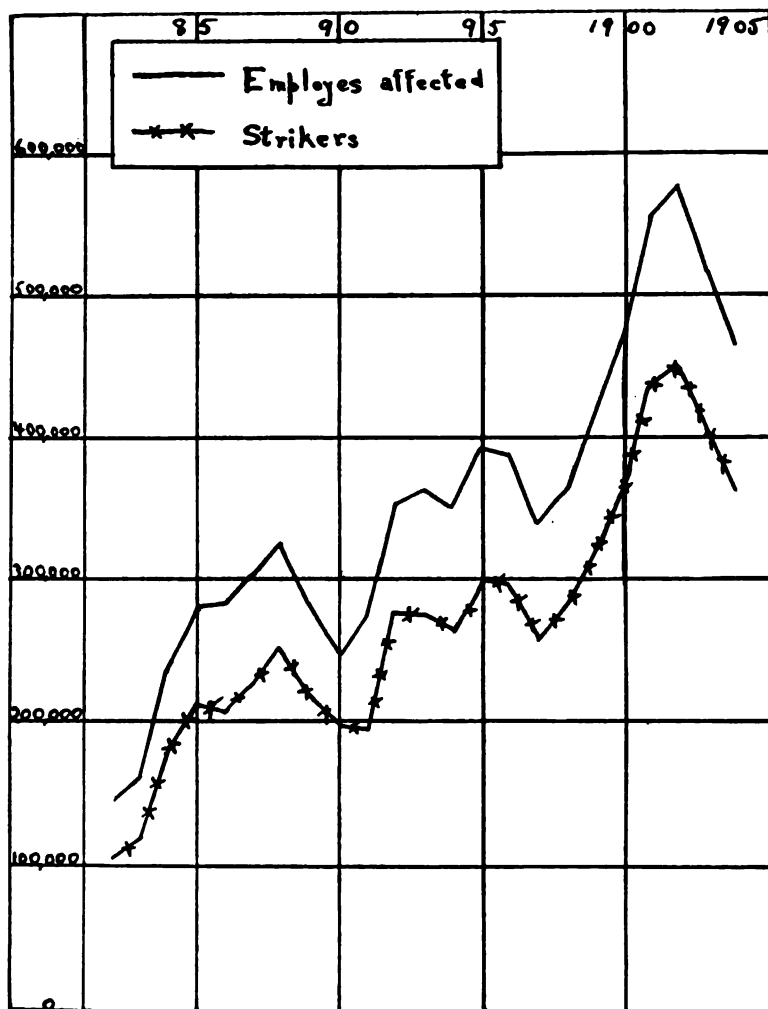
rapidly from 1881 to 1888 and less rapidly from that time until 1893. A slight decrease then followed, but from 1896 to 1904

the increase was very rapid. The number of establishments affected also increased rapidly until 1888, remained practically stationary until 1896, increased rapidly until 1901, and then declined slightly in 1902 and 1903. Diagram III shows that with slight fluctuations the actual number of strikes and the number of employees affected increased until 1902, when a rather marked decrease took place. Thus we may say that, in general, during the twenty-five years under discussion the number of strikes, strikers, establishments, and employees affected increased absolutely at a rapid rate.

But are strikes increasing relatively? The Census Office* estimated that from 1900 to 1905 the population of the United States had increased 8.4 per cent. and that the number of wage-earners in the manufacturing industries had increased 16 per cent. The increase in the number of strikes during the same period (comparing the actual number of strikes in 1900 with those of 1905) was 16.1 per cent., while the number of strikers, establishments, and employees affected in the same two years shows an actual decrease. This would lead some to claim that strikes, although not decreasing relatively in number, were decreasing greatly in importance. But, as pointed out above, nothing can be gained by comparing the statistics of one year with those of another. Results thus obtained depend entirely upon the years chosen. The curves in Diagrams II and III also show a decrease in the number of strikers, establishments, and employees affected in 1902 and 1903. But this fact affords no ground for arguing that such a decrease will continue either actually or relatively. Other decreases are to be noted in the curves extending at times over several years, but such declines have always been followed by a rapid recovery. Therefore, we conclude that there is nothing in the above statistics that would lead us to believe that strikes are decreasing either absolutely or relatively. The general tendency of the curves has always been upward and usually at a rather rapid rate.

* United States Bureau of the Census, Bulletin 71, p. 15.

DIAGRAM III. CHANGES IN NUMBER OF STRIKERS AND IN NUMBER OF EMPLOYEES AFFECTED BY STRIKES.



Much has been said in recent years about the influence of labor organizations on the number of strikes. If we divide the total number of strikes into those ordered by labor organiza-

tions and those not so ordered, we obtain the results shown by Table VI and by Diagram IV.

TABLE VI.
A COMPARISON OF THE STRIKES OF ORGANIZED AND UNORGANIZED LABOR.

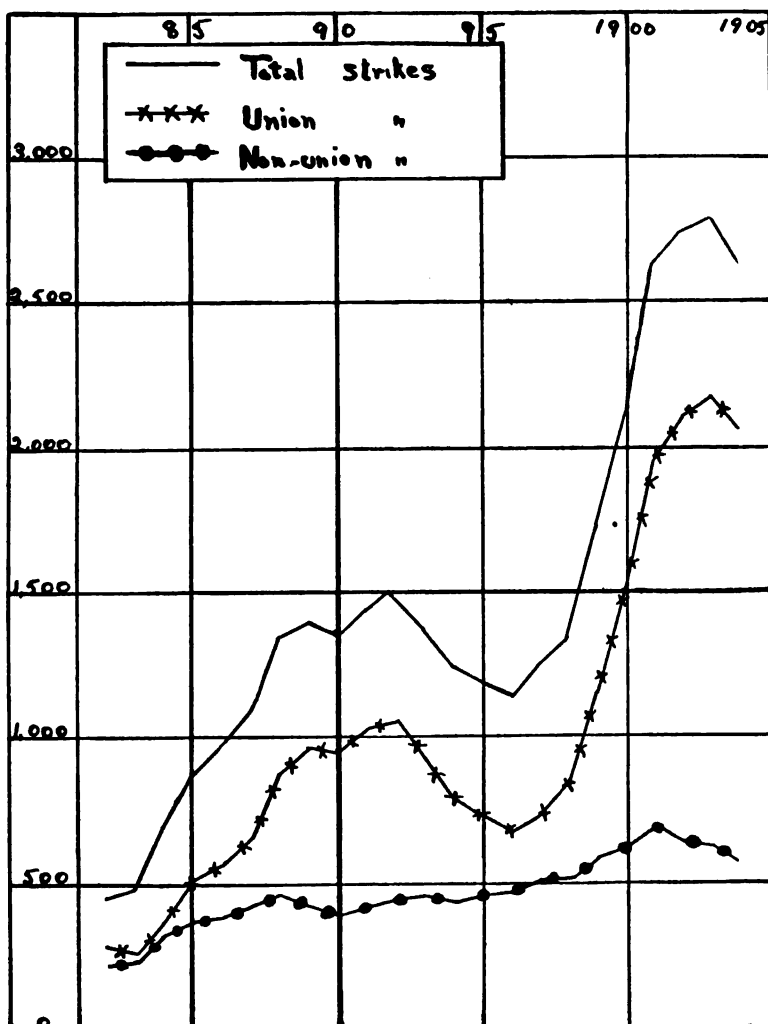
Years.	Ordered by Labor Organizations.			Not ordered by Labor Organizations.		
	Number.	Per cent.	Smoothed.	Number.	Per cent.	Smoothed.
1881	223	47.4		248	52.6	
82	220	48.5	50.8	234	51.5	49.2
83	271	56.7	52.4	207	43.3	47.6
84	240	54.2	53.6	203	45.8	46.4
85	357	55.3	57.2	288	44.7	42.8
86	763	53.3	59.5	669	46.7	40.5
87	952	66.3	62.1	483	33.7	37.9
88	616	68.1	65.3	288	31.9	34.7
89	724	67.3	69.6	351	32.7	30.4
1890	1306	71.3	70.5	525	28.7	29.5
91	1284	74.8	70.7	432	25.2	29.3
92	918	70.7	69.8	380	29.3	30.2
93	906	69.4	66.4	399	30.6	33.6
94	847	62.8	64.4	501	37.2	35.6
95	658	54.2	61.3	555	45.8	38.7
96	662	64.6	59.4	363	35.4	40.5
97	596	55.3	59.3	482	44.7	40.7
98	638	60.4	61.6	418	39.6	38.4
99	1115	62.1	63.8	682	37.9	36.2
1900	1164	65.4	68.4	615	34.6	31.6
01	2218	75.9	72.1	706	24.1	27.9
02	2474	78.2	76.1	688	21.8	23.9
03	2754	78.8	77.9	740	21.2	22.1
04	1895	82.1	78.6	412	17.9	21.4
05	1552	74.7		525	25.3	

In Diagram IV the curve of the non-union strikes shows a slow but continuous tendency to increase, regardless of fluctuations in the other curves. The general upward tendency of union strikes is noticeable throughout despite the evident decrease during the years 1892-96. This decrease has led many writers to claim that tradesunionism tends to discourage strikes during periods of business depression. Adams, in the chapter above referred to, says: * "Compare the number and

* Adams and Sumner, "Labor Problems," p. 185.

results of the two classes of strikes in the industrial depression which began in 1893. The labor organizations, realizing that conditions were not auspicious, steadily restricted the number

DIAGRAM IV. CHANGES IN NUMBERS OF UNION AND NON-UNION STRIKES.



of strikes. . . . Among the 'unorganized' strikes, however, the movement was reversed. As times grew harder and wages fell, the discontent of the unorganized workmen vented itself in an increased number of strikes." . . . It is a question whether or not the restraining influence of tradesunionism upon strikes during "hard times" has not been overestimated. It is the opinion of the writer that the matter of an increase or decrease in the membership of the union is a movement of far greater importance. Thus we know that during times of business prosperity the membership of the unions grows rapidly, and that strikes are of frequent occurrence. During "hard times," however, the reverse is true. Organized labor declines in influence and orders comparatively few strikes, while at the same time the ranks of the unorganized are greatly augmented with a consequent increase in the number of non-union strikes. Arguing from these premises, the writer has been led to believe that a rough parallel can be drawn between the growth or decline of their membership and the number of strikes called by unions.

TABLE VII.

MEMBERSHIP OF THE AMERICAN FEDERATION OF LABOR COMPARED WITH NUMBER OF STRIKES ORDERED BY LABOR ORGANIZATIONS.

Years.	Membership, American Federation of Labor.	Strikes ordered by labor organizations.
1890	199,500	1306
91	199,100	1284
92	228,400	918
93	246,900	906
94	176,300	847
95	207,100	658
96	243,900	662
97	232,200	596
98	254,900	638
99	323,200	1115
1900	504,400	1164
01	725,500	2218
02	928,290	2474
03	1388,500	2754
04	1562,500	1895
05	1434,800	1552

Thus, for example, we know that during the later '80's the Knights of Labor were very active and that the American Federation of Labor was gaining strength. The percentage of union strikes increased greatly during the same period. The business depression of 1893 greatly reduced the membership of these organizations * and the percentage of union strikes decreased. Following the business revival of 1896, the membership grew rapidly, as did also the percentage of strikes called by the unions. Table VII, taken from the reports of the Industrial Commission and from the published proceedings of the annual meetings of the American Federation of Labor, shows the growth in the membership of that organization based upon the number of votes represented by the delegates in attendance at the annual conventions. In commenting upon these statistics, the Industrial Commission says: † "Yet, while not showing even approximately the absolute membership of American unions, these figures give some indication of the direction and velocity of the movement. The number of members represented in the Federation conventions rose from about 200,000 in 1890 and 1891 to nearly 250,000 in 1893, fell sharply to about 175,000 in 1894, then rose gradually to a little more than 250,000 in 1898, and went up by leaps and bounds to nearly 325,000 in 1899 and to more than 500,000 in 1900." Keeping these facts in mind, we note a corresponding movement in the number of union strikes, as shown in the same table. The parallel would be still more evident if based on the statistics of strikes contained in the annual reports of the Secretary of the American Federation of Labor.‡

One is forced to admit frankly that the union exercises some restraining influence upon the calling of strikes during periods of business depression, but to the writer it would appear, judg-

* Testimony before the Industrial Commission (vol. vii, Digest, p. 109, and Testimony, p. 420) shows that the Knights of Labor reached the lowest point in membership in 1895. Table VII indicates a corresponding decrease in the American Federation of Labor.

† Reports of the Industrial Commission, vol. xvii, p. xix.

‡ Each year this officer publishes the number of strikes called by affiliated organizations as reported to him.

ing from the data presented above: first, that this influence has been greatly exaggerated, and, secondly, that not enough importance has been given to the more primary causes of an increase or decrease in the numbers and membership of these organizations.

In considering the average number of strikers, establishments, and employees affected per strike, we again note how meaningless are the conclusions based upon simple averages covering long periods of time. In Table VIII averages are given for

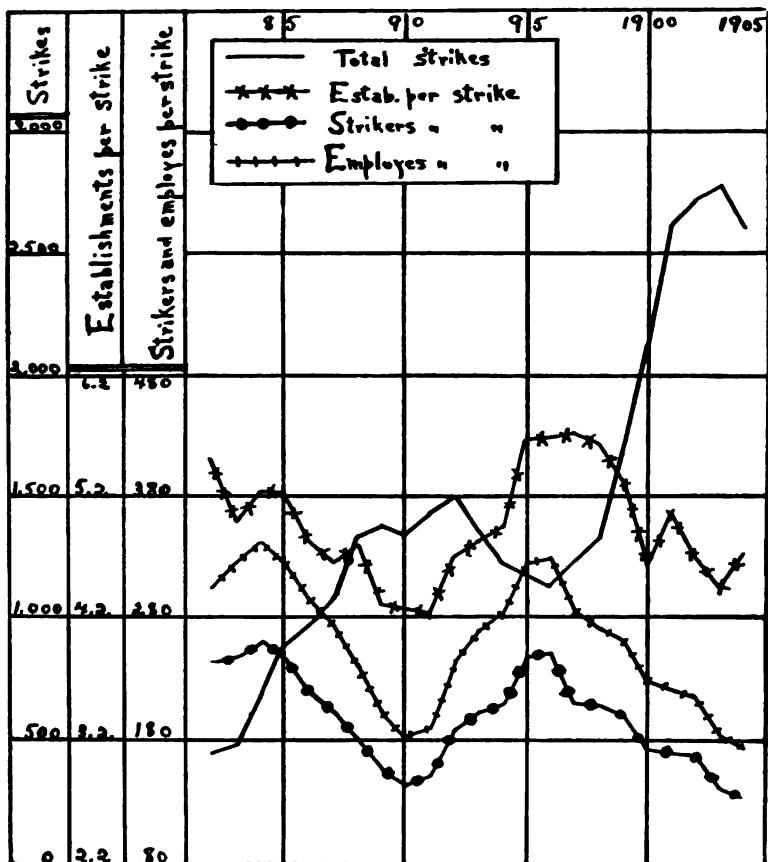
TABLE VIII.

AVERAGE NUMBER OF ESTABLISHMENTS, STRIKERS, AND EMPLOYEES PER STRIKE.

Years.	Establishments per strike.	Strikes per strike.	Employees affected per strike.
1881-86	5.7	279	339
1881-94	4.8	198	258
1881-1900	5.2	205	267
1881-1905	4.9	183	237

the years covered by each of the four reports of the Commissioner of Labor. In Diagram V, however, we note some interesting tendencies. Thus, as the number of strikes increases, the average number of strikers, establishments, and employees affected decreases, and, as the number of strikes decreases, the average number of strikers, establishments, and employees affected increases. We may conclude, therefore, that, as strikes increase in number, they decrease in size; and, as they decrease in number, they increase in size. The curves of Diagram V do not follow this rule in every instance, but the tendency is so marked and so nearly consistent throughout that the above conclusion seems justified. In fact, it is scarcely necessary to prove such a contention by means of statistics, for it is a well-known fact that in times of frequent strikes there are, for every large disturbance, a number of minor disturbances, each affecting but one establishment and a small number of men.

DIAGRAM V. CHANGES IN AVERAGE NUMBERS OF ESTABLISHMENTS, STRIKERS, AND EMPLOYEES AFFECTED BY STRIKES.



From 1896 the average number of strikers, establishments, and employees affected has shown a marked tendency to decrease, and, except for the number of establishments affected, the level reached in 1904 was lower than in any previous year. From this we might conclude that the average strike was tending to decrease in size and importance. If we take into consideration the tendency of the curves for the years previous to 1896, we

might still conclude that, if the average strike was not decreasing in size, at least it was not tending to increase. Or let us consider the matter from another standpoint. Table IX gives the percentage of employees who went out upon strike in those establishments in which strikes were called. The reports of the Commissioner of Labor do not give data for the years previous to 1887. This table seems to substantiate the conclusion that

TABLE IX.

Year.	Employees before Strike.	Strikers.	Per Cent. of Employees Striking.	Smoothed.
	(000 omitted.)	(000 omitted.)		
1887	583.9	272.8	46.7	
88	341.7	103.2	30.2	40.8
89	448.7	205.1	45.7	44.0
1890	601.5	285.9	47.5	41.0
91	488.2	245.0	50.2	42.5
92	515.4	163.5	31.7	43.1
93	521.7	195.0	37.4	43.6
94	1031.7	505.0	48.9	43.2
95	547.5	285.7	49.7	48.9
96	380.5	183.8	48.3	51.1
97	551.2	332.6	60.3	49.0
98	374.6	181.6	48.4	47.7
99	806.9	308.1	38.2	45.5
1900	915.3	399.7	43.6	42.2
01	1067.6	396.3	37.1	40.3
02	1263.7	553.1	43.7	41.2
03	1368.2	531.7	38.8	38.9
04	872.5	375.8	43.0	37.8
05	554.1	176.3	31.8	

the average strike is not becoming more wide-spread in its nature. It shows that the percentage of employees striking in establishments involved in strikes increased from 1887 to 1896, but that from the latter date down to the close of the period 1905 the percentage has steadily decreased.

A further question worthy of consideration is the effect of tradesunionism upon the size of strikes. Professor Adams says:* "Of the 'organized' or 'union' strikes there were 4385

* Adams and Sumner, "Labor Problems," p. 183.

in the five years, 1886-1890, and only 4175 in the five years, 1896-1900. Of the 'unorganized' or 'non-union' strikes there were 2319 in the former period and 2560 in the latter period. The 'union' strikes decreased 4 per cent.; the 'non-union' strikes increased 10 per cent. And as our trade unions get stronger and older, it is very probable that the strike will be even more vigorously restrained, because it is the new and poorly organized unions which foment strikes." Huebner also says:* "The immediate effect of unionism is to increase the number of strikes very rapidly,—then with increased experience the effect is to inaugurate a policy of greatly increasing the size of the strikes side by side with a less rapid increase in the simple number of strikes. The ultimate effect, as unionism becomes better organized, is to check the number of strikes, but to give them a more wide-spread effect and increased importance."

Without at first questioning the accuracy of the conclusions arrived at by both of these writers, let us examine the methods followed in obtaining them. Adams bases his remarks upon statistics grouped by five-year periods, an error already commented upon. Both writers use the data tabulated by the Commissioner of Labor under "Strikes Ordered by Labor Organizations," and from these statistics decide that such and such a thing happens to a union or to unionism as it becomes older and better organized. These data include all strikes declared by all unions, no distinction being made between the strikes ordered by a union organized in 1830 or by one organized in 1899. Neither are the strikes ordered by a sail-makers' union formed in 1857 differentiated from those of a carpenters' union organized ten years later. The former trade has few strikes; the latter, many. Thus it is that the numerous conflicts of the latter greatly outweigh the conservative influence of the former. On the face of the proposition it is readily seen that such data do not permit any one to state decisively what happens to a union or to unionism as the years pass and more experience is gained. New unions are continually being formed, old unions enter upon a series of strikes, the character of the indus-

* Huebner, "Statistical Aspect of the Strike," p. 135.

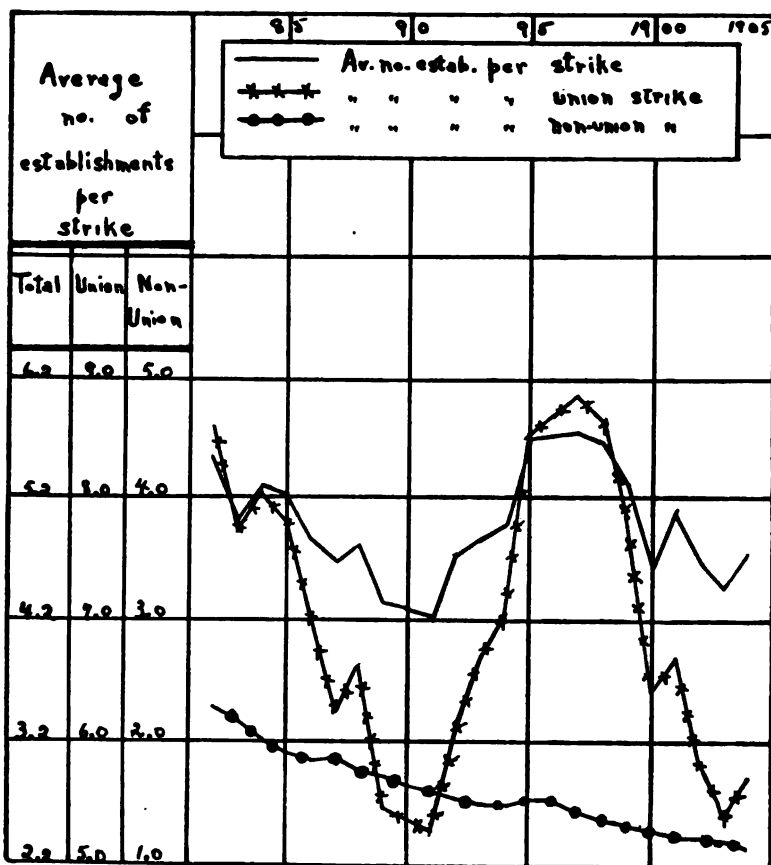
try changes, and a thousand and one things occur which sadly interfere with possible conclusions. Another difficulty lies in the fact that most writers fail to distinguish between the tendency of unionism and the tendency in the development of unions in the aggregate. Unionism may check the number of strikes, as Huebner and Adams claim, yet the number of union strikes may increase at an astonishing rate, as shown by Diagram IV. An increase in the aggregate number of union strikes may indicate nothing as to the tendency of unionism. The restraining influence of unionism, in short, the effects and results of unionism are shown only in the data afforded by individual unions; that is to say, in order to arrive at any conclusion regarding this or any other matter concerning the influence of unionism, an individual union or a number of individual unions (preferably local organizations) should be studied in detail and all changes in policies and actions carefully noted. Statistics of unions in the aggregate, of all unions, regardless of age or environment, do not afford a suitable basis from which to generalize about the tendencies of unionism. Such data, however, do enable us to decide whether or not, when considered in the aggregate, union strikes are becoming more wide-spread in importance or are occurring more frequently. Diagram IV shows that union strikes are not tending to occur less frequently.

The restraining influence of unionism is another matter. All students of the labor problem will admit that a union becomes more conservative with age and consequently strikes less frequently. Unions are often formed as a result of a strike or because a strike is being planned, the latter being the more common cause. Then, too, a new union quite often has to strike a number of times in order to discover just how far it can go in forcing its demands upon the employer. For these reasons a young organization strikes more frequently than an older one in the same trade, and it is the strikes of the former that cause the number of union strikes to increase at such a rapid rate.

Let us now consider Huebner's statement that, as it becomes

better organized, "tradesunionism tends to increase the size of the strike." We can consider this proposition from two different standpoints, (1) from that of unions in the aggregate and (2) from that of unionism. To consider the case of unions in the aggregate, we shall have recourse to statistics such as Huebner uses, but in the case of unionism mere analysis must suffice, as there are no available statistics.

DIAGRAM VI. CHANGES IN THE AVERAGE NUMBER OF ESTABLISHMENTS PER STRIKE.

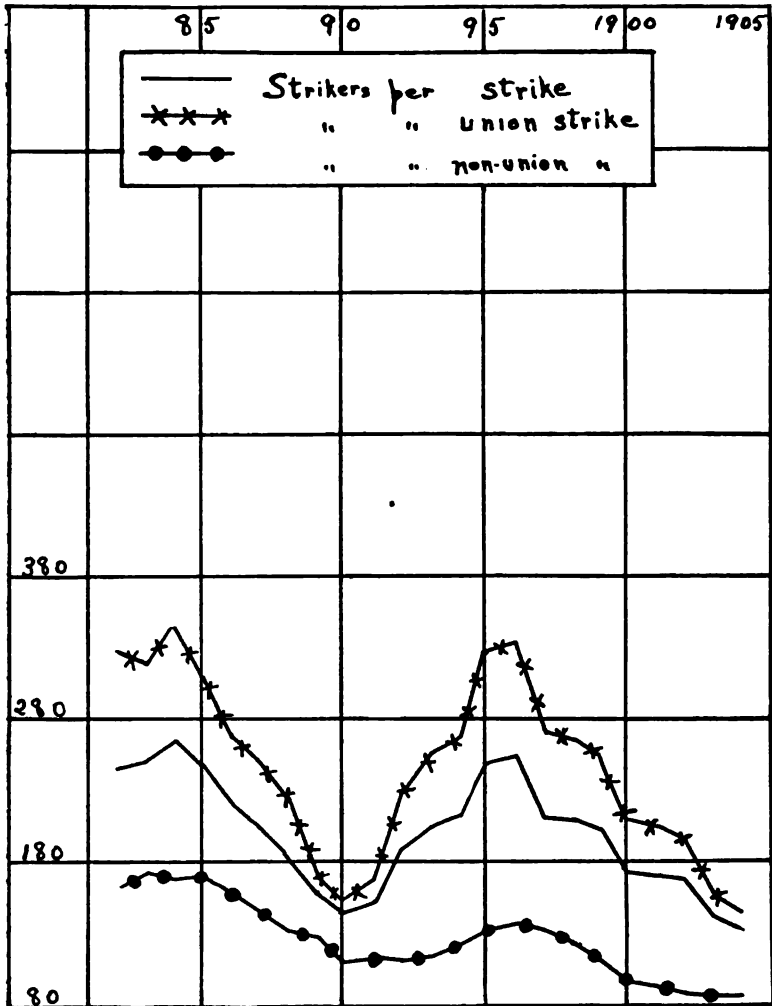


We have already seen that the average strike has not become more wide-spread. Diagrams VI and VII indicate what has happened in regard to union and non-union strikes, considered in the aggregate. Diagram VI shows that the average number of establishments affected per non-union strike steadily decreased from 1881 to 1905. The curve representing the average number of establishments per union strike shows a marked decrease from 1881 to 1891, a period of active organization and great strength on the part of the Knights of Labor. During the depression of 1893 and the consequent inactivity on the part of the unions the number of establishments per union strike increased very rapidly. From 1897 to 1905, however, during which time tradesunionism grew by leaps and bounds and became more experienced, the average decreased rapidly. Similar results are to be noted in the case of the average number of strikers affected per union and per non-union strike, as shown by Diagram VII. The level reached in this case is lower in 1904 than in any other year during the period under discussion. Thus we conclude that the average union strike does not tend to increase in size, nor does it become more wide-spread with the passing of years and the growth of experience on the part of unions in the aggregate.* It is difficult to see why the situation should be otherwise. In the first place, as long as strikes remain more or less local in nature, they will continue to be rather small in size. It is only when the cause of the trouble between the employer and the employees is wide-spread, as in the case of an eight-hour agitation, railway strikes, etc., that a very large number of men are affected. Secondly, the working class is organized to-day for the most part upon trade lines, there being comparatively few industrial unions. With each trade in a shop organized into a separate union, it is easy to see that the number of men in that factory belonging to each union is, as a rule, small. Thus, whenever a strike is called and the union quits work, a very few men only

* More accurate results could be obtained, were strikes classified in accordance with the number of strikers, establishments, and employees affected. This is partly done in Germany, where all strikes are classified as involving 2 to 5, 6 to 10, 11 to 20, 21 to 30, 31 to 50, 51 to 100, 101 to 200, 201 to 500, and 501 or more individuals.

are affected. The rest of the laborers in the city who belong to that union do not strike, neither do the men in other trades in the same factory. It is only the men who are employed at that particular trade in that particular shop who go out

DIAGRAM VII. CHANGES IN THE AVERAGE NUMBER OF STRIKERS PER STRIKE.



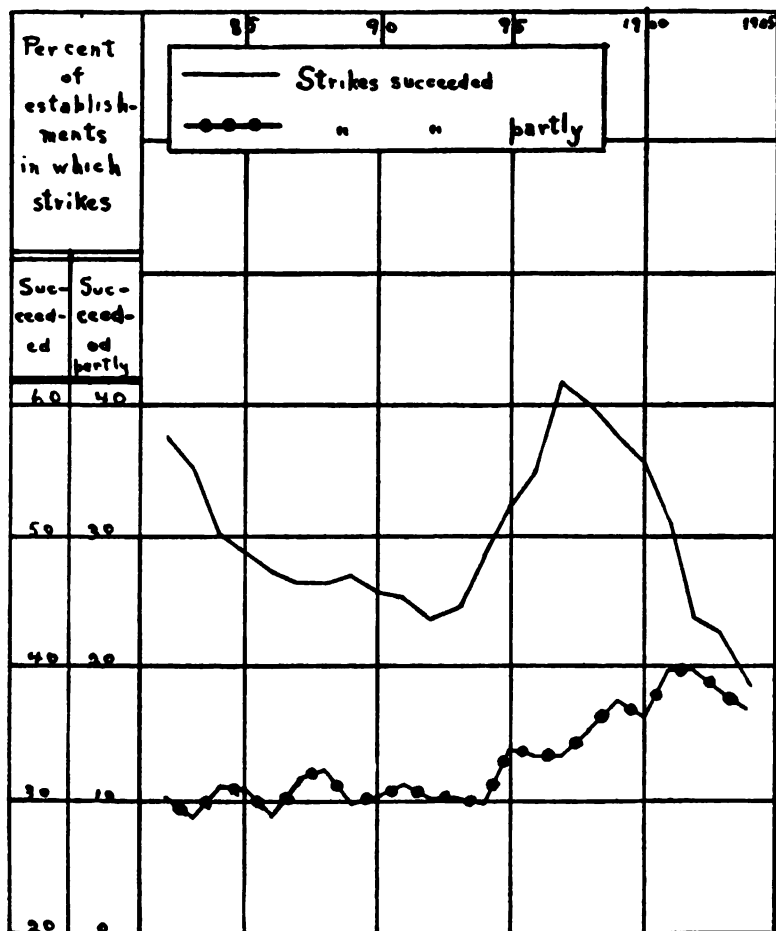
upon the strike.* Thirdly, with the growing complexity of industry the old trades are being broken up into minute subdivisions, each with its separate union. In times past all of these subdivisions belonged to the same trade and considered that they had common interests. Consequently, they struck together. But at the present time, if one of these subdivisions has a grievance, it strikes of its own accord, thus making the average union strike, of necessity, a small one. Fourthly, the change in the causes of industrial disputes is without doubt the most important reason for the decrease in the size of the union strike. During the last ten years, as we have already seen (Diagram I), the closed-shop policy and union rules have rapidly increased as causes of strikes, while wages and hours have been decreasing in importance. A strike ordered because of a demand for a closed shop or for the recognition of the union seldom affects more than one establishment because the grievance is purely local in its nature, and, inasmuch as these strikes have greatly increased in number, they have tended to diminish the size of the average union strike. The closed shop is a demand arising from old and experienced unions. It is not a grievance for the redress of which unions are formed, nor is it one that causes newly organized trades to strike. Its increasing importance as a cause of union strikes is in itself a strong refutation of Huebner's contention that unionism tends to greatly increase the size of the strike.

Diagram VIII gives the percentage of establishments in which strikes were (1) entirely successful and (2) partly successful. From the facts presented we learn that strikes were less successful in 1902, 1903, and 1904 than ever before, and that the percentage of compromised or partly successful strikes increased slowly during the period under discussion.

Diagram IX gives the percentage of establishments in which strikes failed and in which union and non-union strikes failed. A steady increase is to be noted after 1890 in the number of

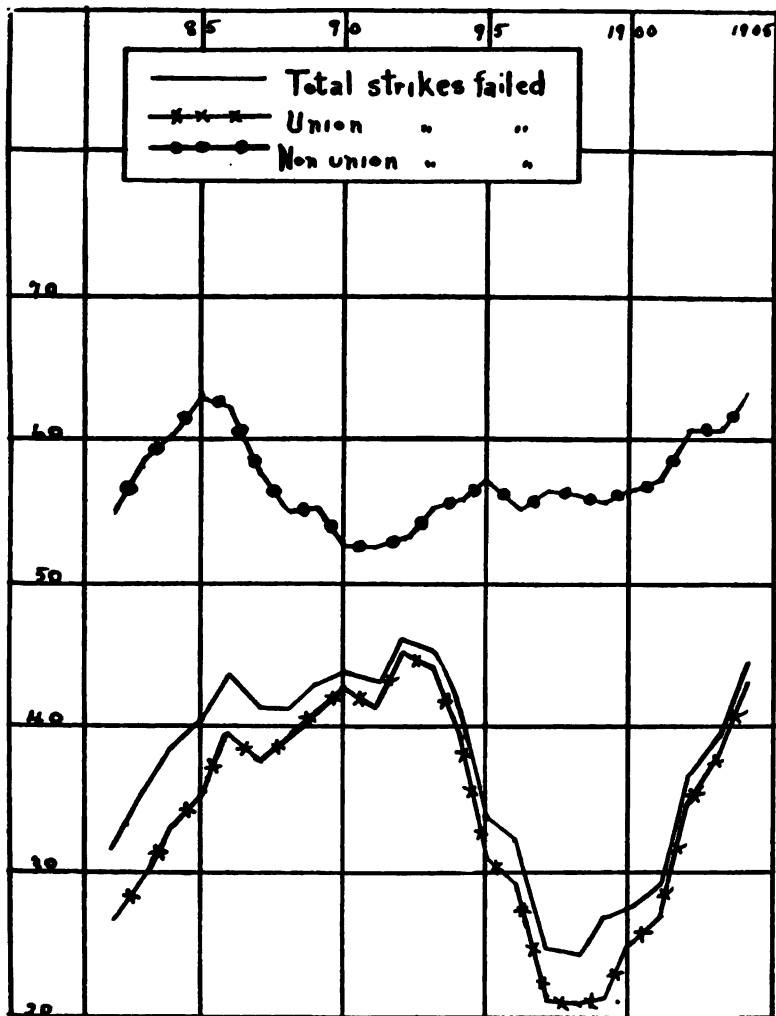
* The growth in the number of sympathetic strikes is, however, of significance in this connection.

DIAGRAM VIII. PERCENTAGE OF STRIKES WHOLLY OR PARTIALLY SUCCESSFUL.



non-union strikes that were unsuccessful. The percentage of union strikes that failed increased steadily during periods of business activity and decreased during business depressions. The tendency of union strikes to become less successful since 1898 substantiates Huebner's statement that "union strikes are not becoming more successful even though unionism is being

DIAGRAM IX. PERCENTAGE OF UNSUCCESSFUL STRIKES.



more and more thoroughly organized." The cause for this evident decrease is without doubt the large number of strikes for the closed shop, the greater portion of which have been lost.

As a result of this brief résumé of the statistical data upon strikes contained in the Twenty-first Annual Report of the United States Commissioner of Labor, we may draw the following conclusions, keeping in mind, however, that we are speaking only of the period 1881-1905:—

(1) That strikes have increased absolutely; that, as compared with the growth in population, they have increased relatively, although there may be some doubt as regards their relative increase when compared with the increase of wage-earners in the manufacturing industries.

(2) That the number of union strikes has increased more rapidly since 1896 than ever before.

(3) That it is not so much the restraining influence of unionism as the loss of membership and bargaining power, together with some decrease in the number of unions, that causes a decrease in the number of union strikes during periods of business depression.

(4) That, as strikes increase, the average number of strikers, establishments, and employees affected per strike decrease, and, as strikes decrease, the size of the average strike increases.

(5) That the average number of strikers, establishments, and employees affected per strike,—i.e., the size of the average strike,—has tended to decrease since 1896.

(6) That, as unions grow stronger, the tendency is for the average union strike to decrease in size and importance.

(7) That the percentage of successful strikes decreases during periods of business prosperity and increases during "hard times."

(8) That compromised strikes are becoming more numerous.

(9) That union strikes are not becoming more successful, even though unionism is being more thoroughly organized.

(10) That tradesunionism affects the causes of strikes by reducing the importance of hours and wages and by increasing the importance of union rules, closed shop, recognition of the union, etc., as causes of strikes.

**FEDERAL CENSUS REPORTS: STATISTICS OF CITIES,
1905.**

BY EDWARD M. HARTWELL, SECRETARY STATISTICS DEPARTMENT,
CITY OF BOSTON.

One of the first and best fruits of placing the Federal Bureau of the Census upon a permanent basis is found in the Bureau's publications relating to the statistics of cities covering the years 1902-05. The latest number of the series is the fullest and most valuable. It is entitled "Special Reports. Statistics of Cities having a Population of 30,000 or over, 1905. Washington: Government Printing Office. 1907."

The tables of this Report relate to 154 cities, which, according to the estimates of the Bureau of the Census, had a population of 30,000 or over in 1905, the basis of estimated annual increase being one-tenth of the actual increase in the period 1890-1900. The cities and the subject-matter are classified according to population under four groups, namely: (1) cities of 300,000 or more inhabitants; (2) cities of 100,000 to 300,000; (3) cities of 50,000 to 100,000; (4) cities of 30,000 to 50,000. No account is taken, as in Bulletin 20, 1905, of cities of 25,000 to 30,000 inhabitants.

Table 1 shows (1) the date of incorporation, (2) area, and (3) population estimated as of June 1 for 1905, 1904, and 1903, and enumerated for 1900 and 1890. Like most of the tables, this is a reference table, consisting (a) of summary statements regarding the whole number of cities and of each of the constituent groups and (b) of detailed data for each city included in the table. All the data are expressed in absolute numbers. The table affords direct comparison for the years specified of the total population of the several groups and their aggregate population, and of detailed data relating to each of the 154 cities. But inquirers who make other comparisons—*e.g.*, be-

tween cities of equal population, cities grouped by States or geographical sections—must rearrange the primary data given in the table for themselves. This remark applies to practically all the forty-six other tables as well as to Table I.

The following tables, compiled from Table I, illustrate the value of the tables as sources of data for compiling secondary comparative tables. In these tables the absolute numbers are derived directly from Table I, while the per cents. have been supplied by the writer.

The following tabular statement shows, by groups, the increase in the number of cities having a population of 30,000 or over, enumerated in 1890 and 1900, estimated for other years:

	1905.	1904.	1903.	1902.	1900.	1890.
Total	154	149	148	145	134	100
Group 1	15	14	14	14	11	6
Group 2	25	25	25	25	27	20
Group 3	47	45	43	43	41	30
Group 4	67	65	66	63	55	44

The following statement shows the percentage of (1) actual increase in 154 cities, by groups, 1890-1900, and (2) of estimated increase 1900-05:—

CITIES WITH POPULATION OF 30,000 OR OVER IN 1905.

A. PER CENT. OF ACTUAL INCREASE, 1890-1900.

All Cities.	Group 1.	Group 2.	Group 3.	Group 4.
154	15	25	47	67
33.34	32.99	37.16	29.68	34.30

B. PER CENT. OF INCREASE OF ESTIMATED POPULATION, 1900-05.

	All Cities.	Group 1.	Group 2.	Group 3.	Group 4.
A. Modified by Census in 10 States, 1904 and 1905	13.37	12.69	14.34	14.34	13.93
B. On basis of actual increase, 1890-1900	12.50	12.40	13.55	11.44	12.77

Inspection of the foregoing statement leads to the conclusion that in each of the groups the relative increase of estimated population in the period 1900-05 was greater than the increase calculated on the basis of their actual increase 1890-1900. This conclusion is corroborated by the actual increase of population, 1900-05, shown by the returns of the State Census in 1905 in eight States for 57 cities, having an aggregate enumerated population of 9,392,297 in 1905. The per cent. of actual increase for 57 cities was 14.30 against 12.58 of calculated increase. In other words, Table I affords positive evidence, not to be found elsewhere in convenient form, that in the case of more than a third of the cities embraced in it, having an aggregate population amounting to 42.29 per cent. of the total population given for 154 cities (22,204,506), the actual increase of population, 1900-1905, was 14.30 per cent. against 12.58 per cent. of calculated increase. It may be noted that there was a State census taken in Michigan in 1904 which showed an aggregate population of 530,342 in the five cities of the State included in Table I, or an actual increase of 49,577 (10.31 per cent.) from 1900 against a calculated increase of 43,846 (9.12 per cent.).

TABLE I.—SHOWING INCREASE OF POPULATION SINCE 1900 IN CITIES OF 30,000 OR OVER OF ENUMERATED POPULATION, 1905.

State.	Number of Cities.	Population by State Census.	Increase from 1900.			
			Actual.	Per Cent.	* Calculated.	Per Cent.
Massachusetts	19	1,735,192	155,671	9.86	199,764	16.93
New York	12	5,145,166	673,727	15.07	565,171	12.64
New Jersey	10	1,038,729	131,982	14.56	118,282	13.04
Wisconsin	5	441,442	38,755	9.62	58,648	14.56
Iowa	4	198,316	31,515	18.89	10,860	6.51
Minnesota	3	523,939	105,187	25.11	43,872	10.48
Rhode Island	3	274,212	31,180	12.82	31,212	12.84
Florida	1	35,301	6,872	24.18	5,614	19.75
Total	57	9,392,297	1,174,889	14.30	1,033,423	12.58

* On basis of actual increase, 1890-1900.

The State census of Kansas, also taken in 1904, showed an aggregate population of 128,716 in the three cities of that State included in Table I, or an actual increase of 19,019 (17.43 per cent.) from 1900 against a calculated increase of 6,608 (6.02 per cent.).

Inspection of the foregoing tables discloses considerable diversity in the relative actual increase of population in cities by State groups. It also shows a greater relative increase in the cities of Minnesota, Iowa, and Florida than in those of New York and New Jersey, and, furthermore, that the cities of Massachusetts and Wisconsin failed to grow as fast in 1900-05 as in the previous decade.

Whether the population of the cities in the States which had a census in 1905 increased relatively more than the rest of the population cannot be determined from any data furnished by the Bureau of the Census in this Report.

The geographical distribution of cities of 30,000 inhabitants or over is of considerable interest, as most of them are east of the Mississippi River and north of the line of the Ohio River, continued eastward, roughly speaking. There is a marked concentration of the cities of this class within a comparatively small number of States, as is shown in the following statement, which includes all the States having five or more cities with a population of 30,000 or over. Beginning with Massachusetts, the eleven States specified constitute a continuous belt from the Atlantic Ocean to the Great Lakes and the Mississippi River. They contain 62 per cent. of the 154 cities and 73 per cent. of their population. In them we find the greatest pressure of population and the most diversified and urgent problems of city government.

A glance at this statement discloses the fact that the first six States belonged to the thirteen original States, and that the rest were among the first free States to be settled by the emigration from the original States. Again, according to the nomenclature adopted in the Federal Census of 1900, the first six States belong to the North Atlantic division and the last five to the North Central division.

State.	Number of Cities.	Aggregate Population.
1. Massachusetts	19	1,735,192
2. Rhode Island	3	274,212
3. Connecticut	5	384,535
4. New York	12	5,145,166
5. New Jersey	10	1,038,729
6. Pennsylvania	16	2,629,120
7. Ohio	9	1,356,452
8. Indiana	5	320,412
9. Illinois	7	2,238,361
10. Michigan	5	542,736
11. Wisconsin	5	441,442
Total	96	16,106,357

Table II serves to show the distribution by geographical divisions of the 154 cities covered by the Report and their absolute and relative increase in population in the period 1900-05.

The 50 States and Territories included in the several divisions, with the number of cities in each given in parenthesis, are as follows: *I. North Atlantic*, Maine (1), New Hampshire (1), Vermont (0), Massachusetts (19), Rhode Island (3), Connecticut (5), New York (12), New Jersey (10), Pennsylvania (16), 9 States in all; *II. South Atlantic*, Delaware (1), Maryland (1), District of Columbia (1), Virginia (2), West Virginia (1), North Carolina (0), South Carolina (1), Georgia (4), and Florida (1), 9 States in all; *III. North Central*, Ohio (9), Indiana (5), Illinois (7), Michigan (5), Wisconsin (5), Minnesota (3), Iowa (4), Missouri (4), North Dakota (0), South Dakota (0), Nebraska (3), and Kansas (3), 12 States in all; *IV. South Central*, Kentucky (2), Tennessee (4), Alabama (3), Mississippi (0), Louisiana (1), Texas (4), Indian Territory (0), Oklahoma (0), and Arkansas (1), 9 States in all; and *V. Western*, Montana (1), Wyoming (0), Colorado (2), New Mexico (0), Arizona (0), Utah (1), Nevada (0), Idaho (0), Washington (3), Oregon (1), and California (4), 11 States in all.

TABLE II.—CITIES WITH POPULATION OF 30,000 OR OVER IN 1905.

A. NUMBER OF CITIES BY DIVISIONS AND GROUPS, 1905.

Division.	Total.	Group 1.	Group 2.	Group 3.	Group 4.
I. North Atlantic . . .	67	5	11	25	26
II. South Atlantic . . .	12	2	1	5	4
III. North Central . . .	48	6	8	9	25
IV. South Central . . .	15	1	2	4	8
V. Western	12	1	3	4	4
Total	154	15	25	47	67

B. ESTIMATED POPULATION, 1905.

I. North Atlantic . . .	11,324,701	6,753,920	1,737,186	1,821,959	1,011,636
II. South Atlantic . . .	1,455,579	849,100	102,702	352,289	151,488
III. North Central . . .	7,026,220	4,046,685	1,383,903	635,865	959,767
IV. South Central . . .	1,221,766	309,639	343,895	253,921	314,311
V. Western	1,176,240	364,677	380,172	283,132	148,259
Total	22,204,506	12,324,021	3,947,858	3,347,166	2,585,461

C. INCREASE IN POPULATION, 1900-05.

I. North Atlantic . . .	1,286,435	788,126	169,700	209,249	119,360
II. South Atlantic . . .	129,779	61,425	12,830	34,056	21,468
III. North Central . . .	942,780	494,183	222,288	99,776	126,533
IV. South Central . . .	117,099	22,535	36,844	32,464	25,256
V. Western	143,061	21,895	53,408	44,256	23,502
Total	2,619,154	1,388,164	495,070	419,801	316,119

D. PER CENT. OF INCREASE OF POPULATION, 1900-05.

I. North Atlantic . . .	12.82	13.21	10.83	12.97	13.38
II. South Atlantic . . .	9.79	7.79	14.28	10.70	16.51
III. North Central . . .	15.50	13.91	19.18	18.61	15.18
IV. South Central . . .	10.60	7.85	12.00	14.66	8.74
V. Western	13.85	6.39	16.34	18.53	18.84
Total, 5 years, 1900-05	13.37	12.69	14.34	14.34	13.93

The most salient facts brought out by Table II (see D) are: (1) the greater per cent. of increase in population of the cities of the North Central division in comparison with those of other divisions; (2) the greater per cent. of increase for the cities of Groups 1, 2, and 3 in that division; (3) the fact that the per cent. of increase in the cities of Group 4 in the Western division considerably exceeded that of cities of the same group in any other division; and (4) that Groups 2 and 3, with the same per cent. of increase (14.34), surpassed Groups 1 and 4 in per cent. of increase in the period 1900-05. It must be admitted, however, that strict comparisons between the several groups, whether as to population or expenses of government, cannot be made, for the reason that the groups are incommensurate.

Tables III-VI, inclusive, are introduced for the purpose of showing some of the more significant costs of government: (1) in the ten largest cities of the country; and (2) in two characteristic groups,—namely, the cities of Massachusetts and Ohio. These tables serve also to indicate the variety and character of the financial tables set forth in the report under consideration.

Thus the figures in Table III for Population are derived from Table I; those for Assessed Valuation, from "Table 28. Assessed Valuation of Property, etc., Basis of Assessment and General Property Taxes levied, 1905"; for Net Debt, from "Table 23. Total and Per Capita Debt Obligations at Close of Year, together with Changes during the Year in Par Value of Debt Obligations and of Sinking Fund Assets, 1905; Comparative Summary 1902-05"; and for Assets, from "Table 27. Value at Close of Year of Principal Permanent Properties, etc., 1905."

In Tables III and IV, Cincinnati, eleventh city as to population in 1900, is given tenth place, instead of San Francisco, because the Bureau of the Census refrained from publishing per capita averages of the decimated population of San Francisco for 1905. Inspection of the per capita averages, and the figures showing the rank based upon them, in III B and IV B, leads to the conclusion that the taxable basis, corporate pay-

ments, and selected expenses of the several cities are not proportional to their populations. Again, the range between New York and Cincinnati in most particulars is so great as to render averages for the ten cities of little practical value, particularly if one seeks to determine the rank of the several cities as regards the economy and efficiency of their housekeeping. These facts should be taken account of by those who undertake to institute strict comparisons of any kind between the groups of cities, or between cities of the same group, as set forth in the series of tables contained in the Report.

Those who would charge any city or group of cities with extravagance or inefficiency, on the basis of the variations found in the tables of the Report, should give careful heed to the warning set forth on page 79, under description of general tables:

"The most important features of this table [Table 30] and the other tables with per capita averages consist in the great differences shown by different cities in the amounts of total and per capita payments and receipts of the several classes. . . . In the case of most of the cities the variations in per capita payments and receipts reflect differences in municipal organizations or administration; for a few they unquestionably result from imperfections of the census report. . . . To refer all variations found in the tables to any one single factor or cause would inevitably be unjust to many cities. The figures of the table can be correctly used only in connection with some knowledge of the local condition or circumstances affecting any class of data to be compared by per capita averages."

On the strength of per capita averages for general property tax, debt, corporate payments for expenses, etc., published in the series of reports on Statistics of Cities by the Bureau of the Census, Boston's city government has been pronounced guilty of great extravagance and inefficiency by credulous politicians, publicists, and newspaper writers, who have disregarded the warnings of the Bureau of the Census and even the plain showing of the tables whence their arguments were derived.

TABLE III.—LEADING CITIES OF THE UNITED STATES, 1905.

A. ABSOLUTE NUMBERS.

City.	Population (estimated).	Assessed Valuation.*	Rank.	Net Debt.	Rank.	Assets.	Rank.
1. New York .	4,000,403†	\$6,194,329,218	1	\$475,670,321	1	\$752,034,538	1
2. Chicago . .	1,990,750	2,719,944,166	2	66,355,106	3	139,769,989	4
3. Philadelphia	1,417,062	1,238,861,426	4	63,490,228	4	203,641,550	2
4. St. Louis .	636,973	1,102,260,413	5	20,480,194	8	58,998,121	6
5. Boston . .	595,380†	1,260,908,081	3	67,479,008	2	152,992,670	3
6. Baltimore .	546,217	503,144,182	6	26,805,989	6	41,559,022	9
7. Cleveland .	437,114	356,721,666	8	24,210,387	7	47,342,765	7
8. Buffalo . .	376,914†	275,278,359	10	18,904,018	10	26,173,952	10
9. Pittsburg .	364,161	501,565,740	7	19,686,123	9	42,939,800	8
10. Cincinnati .	343,337	348,007,886	9	34,398,412	5	59,514,575	5
Total . . .	10,708,311	\$14,501,021,137		\$817,479,781		\$1,524,966,982	

B. RELATIVE NUMBERS,—i.e., PER CAPITA.

City.	General Property Tax.	Rank.	Assessed Valuation.*	Rank.	Net Debt.	Rank.	Assets.	Rank.
1. New York .	\$22.10	2	\$1,548.43	3	\$118.91	1	\$187.99	2
2. Chicago . .	11.38	9	1,366.30	5	33.33	9	70.21	9
3. Philadelphia	12.68	7	974.25	8	44.88	8	143.70	4
4. St. Louis .	14.74	5	1,746.93	2	32.15	10	93.50	7
5. Boston . .	31.17	1	2,117.82	1	113.34	2	256.96	1
6. Baltimore .	12.09	8	921.14	7	49.08	7	76.09	8
7. Cleveland .	13.14	6	816.08	9	55.39	4	108.31	6
8. Buffalo . .	15.66	4	730.35	10	50.15	6	69.44	10
9. Pittsburg .	16.37	3	1,377.32	4	54.06	5	117.92	5
10. Cincinnati .	10.69	10	1,013.60	6	100.19	3	173.34	3
Total . . .	\$17.26		\$1,354.18		\$76.35		\$142.40	

* On basis of 100 per cent. of true value.

† Enumerated.

For instance, a certain religious newspaper pronounced Boston's city government "the worst in Christendom" because its debt per capita exceeded that of any other city. Yet Table 38, Census Bulletin 20, 1905, which on page 440 gave Boston's per capita total debt for 1903 as \$148.25, on the opposite page gave Newton, Mass., Boston's near neighbor, \$188.24 per capita of total debt for 1903. It may be remarked, in passing, that it appears from the population estimates of Boston and Newton for 1903, viewed in the light of the census of 1905, that their corresponding estimates given in Bulletin 20 were too high, and consequently the per capita figures for both cities, throughout Bulletin 20, were too low.

Beyond question the per capita net debt of Boston for 1905 (namely, \$113.34) is high as compared with that of any other city included in Table III B, but it is also to be noted that, while Boston ranked second as regards net debt, it was first in respect to assessed valuation and assets. Still, Boston's net debt per capita, \$113.34 for 1905, given in Table 23 of the Report, as appears from the same table, was exceeded by that of New York City \$118.91, and of Newton, Mass., \$116.89, and was approached by that of Seattle, Wash., \$105.22, and Cincinnati, \$100.19. What conclusion can be drawn from such per capita averages, except that the factors which determine their variations cannot be determined without careful and patient analysis of the debt, the objects for which it was incurred, and the character and value of the improvements acquired on account of debt obligations? Tables 23 and 27 of the Report afford some data for an approximate analysis, but the labor involved in even an approximate analysis is such as most critics of city government would naturally shrink from.

The figures in Table IV for Corporate Payments, Expenses, and Outlays are derived from "Table 4. Principal Classes of Corporate Payments and Receipts"; for Expenses of Police and Highways, from "Table 30. Payments for Specified Expenses and Outlays, Total and Per Capita," which is in effect a summary of the most elaborate and detailed table in the Report,—namely, "Table 5," covering pages 138–193. The Expenses of

Schools are taken from "Table 32. Costs and Receipts for Schools, Total and Per Capita"; and those for Interest, from "Table 5. Payments for General Expenses and Special Service Expenses, etc., 1905; Comparative Summary, 1902-05." In passing, it may be said of Table 5 that the data in it are set forth under nine general heads, *e.g.*: I. General Government; II. Protection of Life and Property; IV. Highways; V. Charities and Correction; VI. Education, and under numerous sub-heads for departments; *e.g.*, Executive Boards and Commissions, Elections, Police, Hospitals, Parks, etc. Thanks to its elaborate system of rubrics and its division of expenses into "salaries and wages," "all other," etc., intra-tabular comparison of cities in respect to a very great number of particulars is rendered possible.

Tables IV-VI have been prepared in order to determine the rank of the cities included therein with respect to the more important classes of payments for expenses of maintenance. Reference to "Table 33. Per Cent. Distribution, by Object of Payment of General Service Expenses, 1905," page 314 of the Report, shows that, of the total expenses of 154 cities, 25.9 per cent. were for schools, 12.7 for police department, 10.9 for highways, and 10.1 for interest, the remaining per cents. being less. Table 33, it may be remarked, is a new and helpful table, and especially welcome because it summarizes in terms of percentage Table 5, the most extensive and elaborate table in the Report.

The figures in Tables V and VI, whose rubrics correspond with the rubrics in Tables III and IV, respectively, are derived from the sources specified above.

TABLE IV.—LEADING CITIES OF THE UNITED STATES, 1905. PAYMENTS, BY SELECTED OBJECTS.

A. ABSOLUTE NUMBERS.

City.	Corporate Payments for:				Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
	Expenses.	Rank.	Outlays.	Rank.								
1. New York	\$103,704,155	1	\$60,699,022	1	\$13,361,668	1	\$6,757,480	1	\$21,522,749	1	\$8,816,558	1
2. Chicago	26,295,598	2	16,405,154	2	4,118,202	2	1,157,398	5	7,331,149	2	2,472,046	2
3. Philadelphia . . .	25,828,719	3	6,706,355	4	3,290,943	3	2,462,050	2	4,898,092	3	1,136,231	5
4. St. Louis	12,944,892	5	4,999,297	6	1,600,217	5	1,358,479	4	2,106,529	5	572,358	8
5. Boston	21,166,675	4	7,946,310	3	1,923,490	4	2,028,769	3	3,690,349	4	2,172,103	3
6. Baltimore	7,856,440	6	5,049,825	5	1,089,498	6	701,279	8	1,558,386	7	644,702	7
7. Cleveland	6,914,773	7	4,328,053	7	631,084	9	794,207	6	1,921,568	6	750,338	6
8. Buffalo	6,202,385	9	2,073,995	10	822,885	7	751,648	7	1,400,981	9	558,002	9
9. Pittsburgh	5,927,991	10	3,906,732	8	588,920	10	596,073	10	1,462,606	8	546,680	10
10. Cincinnati	6,240,162	8	3,740,128	9	638,469	8	620,366	9	1,136,846	10	1,145,627	4
Total	\$223,171,790		\$115,140,515		\$28,065,376		\$17,427,755		\$47,029,255		\$18,814,045	

B. RELATIVE NUMBERS,—*I.e.*, PER CAPITA.

City.	Corporate Payments for:				Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
	Expenses.	Rank.	Outlays.	Rank.								
1. New York	\$25.95	2	\$15.17	1	\$3.34	1	\$1.69	7	\$5.38	2	\$2.20	3
2. Chicago	13.21	10	7.74	8	2.07	6	0.53	10	3.68	6	1.24	7
3. Philadelphia . . .	18.23	4	4.73	10	2.32	4	1.88	4	3.46	7	0.81	10
4. St. Louis	20.33	3	7.85	7	2.51	3	2.13	2	3.31	8	0.90	9
5. Boston	35.55	1	13.35	2	3.23	2	3.41	1	6.20	1	3.65	1
6. Baltimore	14.38	9	9.25	6	1.99	7	1.28	9	2.85	9	1.18	8
7. Cleveland	15.82	8	9.90	5	1.44	10	1.82	5	4.40	3	1.72	4
8. Buffalo	16.46	6	5.50	9	2.18	5	1.99	3	3.72	5	1.41	6
9. Pittsburgh	16.28	7	10.73	4	1.62	9	1.64	8	4.01	4	1.50	5
10. Cincinnati	18.18	5	10.89	3	1.86	8	1.81	6	3.31	8	3.34	2
Total	\$20.84		\$10.72		\$2.62		\$1.63		\$4.39		\$1.76	

TABLE V.—CITIES OF MASSACHUSETTS WITH POPULATION OF 30,000 OR OVER, 1905.

A. ABSOLUTE NUMBERS.

City.	Population.	Corporate Payments for:				Selected Expenses.							
		Expenses.	Rank.	Outlays.	Rank.	Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
1. Boston . . .	595,380	\$21,166,675	1	\$7,946,310	1	\$1,923,490	1	\$2,028,769	1	\$3,690,349	1	\$2,172,103	1
2. Worcester . .	128,135	2,318,931	2	386,562	3	163,027	2	299,989	2	624,887	2	79,770	9
3. Fall River . .	105,762	1,626,495	4	373,713	4	145,768	3	195,923	6	373,214	6	147,728	4
4. Cambridge . .	97,434	1,991,343	3	928,570	2	152,342	3	231,699	4	491,362	3	288,351	2
5. Lowell	94,889	1,617,554	5	177,639	12	144,057	4	276,624	3	392,043	5	125,787	5
6. Lynn	77,042	1,478,010	7	259,460	9	97,758	7	130,905	11	264,706	9	105,514	8
7. New Bedford .	74,362	1,205,506	9	186,185	11	122,733	6	142,561	10	270,799	8	122,145	6
8. Springfield . .	73,540	1,351,317	8	362,598	5	95,303	8	218,366	5	426,355	4	59,296	13
9. Lawrence . . .	70,050	939,527	12	113,131	15	73,154	10	151,113	9	218,675	11	59,593	12
10. Somerville . .	69,272	1,166,114	10	156,659	13	79,467	9	169,327	7	332,172	7	111,582	7
11. Holyoke . . .	49,934	975,112	11	274,376	7	58,262	12	105,538	12	201,314	12	74,970	10
12. Brockton . . .	47,794	713,457	14	323,822	6	57,370	13	79,312	18	170,037	16	56,727	14
13. Malden	38,037	726,305	13	73,076	18	35,683	19	97,052	13	193,278	13	70,368	11
14. Haverhill . . .	37,830	605,672	15	62,707	19	35,998	18	79,458	17	170,728	15	27,925	18
15. Salem	37,627	571,465	17	252,608	10	43,921	15	95,163	14	137,699	17	22,590	19
16. Chelsea	37,289	602,988	16	79,094	17	45,632	14	84,283	16	179,445	14	56,374	15
17. Newton	36,827	1,503,601	6	261,995	8	70,594	11	166,997	8	238,179	10	157,155	3
18. Fitchburg . . .	33,021	521,573	18	119,575	14	37,970	17	87,244	15	123,423	19	43,351	16
19. Taunton	30,967	517,551	19	97,302	16	38,811	16	63,030	19	125,664	18	42,284	17
Total	1,735,192	\$41,590,196		\$12,435,382		\$3,421,340		\$4,703,353		\$8,624,320		\$3,823,613	

B. RELATIVE NUMBERS,—i.e., PER CAPITA.

City.	Corporate Payments for:				Selected Expenses.							
	Expenses.	Rank.	Outlays.	Rank.	Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
1. Boston	\$35.55	2	\$13.35	1	\$3.23	1	\$3.41	2	\$6.20	2	\$3.65	2
2. Worcester	18.10	8	3.02	12	1.27	8	2.34	10	4.88	6	0.62	17
3. Fall River	15.38	16	3.53	9	1.38	6	1.85	17	3.53	17	1.40	9
4. Cambridge	20.44	3	9.53	2	1.56	4	2.38	9	5.05	5	2.96	3
5. Lowell	17.05	9	1.87	17	1.52	5	2.92	4	4.13	10	1.33	11
6. Lynn	19.18	5	3.37	10	1.27	8	1.70	18	3.44	18	1.37	10
7. New Bedford	16.21	12	2.50	13	1.65	3	1.92	16	3.64	15	1.64	5
8. Springfield	18.38	7	4.93	7	1.30	7	2.97	3	5.80	3	0.81	15
9. Lawrence	13.41	19	1.62	19	1.04	14	2.16	12	3.12	19	0.85	14
10. Somerville	16.84	10	2.26	14	1.15	13	2.44	8	4.80	8	1.61	6
11. Holyoke	19.53	4	5.49	6	1.17	12	2.11	13	4.03	12	1.50	8
12. Brockton	14.93	18	6.78	4	1.20	11	1.66	19	3.56	16	1.19	13
13. Malden	19.09	6	1.92	16	0.94	16	2.55	6	5.08	4	1.85	4
14. Haverhill	16.01	14	1.66	18	0.95	15	2.10	14	4.51	9	0.74	16
15. Salem	15.19	17	6.71	5	1.17	12	2.53	7	3.66	14	0.60	18
16. Chelsea	16.17	13	2.12	15	1.22	10	2.26	11	4.81	7	1.51	7
17. Newton	40.83	1	7.11	3	1.92	2	4.53	1	6.47	1	4.27	1
18. Fitchburg	15.80	15	3.62	8	1.15	13	2.64	5	3.74	13	1.31	12
19. Taunton	16.71	11	3.14	11	1.25	9	2.04	15	4.06	11	1.37	10
Total	\$23.97		\$7.17		\$1.96		\$2.71		\$4.91		\$2.20	

TABLE VI.—CITIES OF OHIO WITH POPULATION OF 30,000 OR OVER, 1906.

A. ABSOLUTE NUMBERS.

City.	Population.	Corporate Payments for:				Selected Expenses.							
		Expenses.	Rank.	Outlays.	Rank.	Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
1. Cleveland . .	437,114	\$6,914,773	1	\$4,328,053	1	\$631,084	2	\$794,207	1	\$1,921,568	1	\$750,338	2
2. Cincinnati . .	343,337	6,240,162	2	3,740,128	2	638,469	1	620,366	2	1,136,846	2	1,145,627	1
3. Toledo . . .	155,287	1,833,493	4	1,112,421	4	151,572	3	234,812	3	493,474	4	241,903	3
4. Columbus . .	142,105	1,959,140	3	1,704,933	3	148,952	4	111,534	4	512,643	3	160,068	4
5. Dayton . . .	98,350	1,186,678	5	643,619	5	117,101	5	100,982	5	351,296	5	114,424	5
6. Youngstown .	51,516	691,823	6	230,408	7	70,552	6	58,378	8	193,035	7	40,933	8
7. Akron	49,403	695,385	7	236,782	6	45,753	7	86,948	6	198,127	6	54,443	7
8. Springfield . .	41,433	535,911	8	125,850	9	33,748	8	69,019	7	130,819	8	24,702	9
9. Canton . . .	37,907	386,501	9	187,259	8	23,955	9	33,100	9	124,737	9	65,959	6
Total . .	1,356,452	\$20,443,866		\$12,309,453		\$1,861,186		\$2,109,355		\$5,052,545		\$2,568,297	

B. RELATIVE NUMBERS,—i.e., PER CAPITA.

City.	Corporate Payments for:				Selected Expenses.							
	Expenses.	Rank.	Outlays.	Rank.	Police Department.	Rank.	Highways.	Rank.	Schools.	Rank.	Interest.	Rank.
1. Cleveland	\$15.82	2	\$9.90	3	\$1.44	2	\$1.82	1	\$4.40	1	\$1.72	3
2. Cincinnati	18.18	1	10.89	2	1.86	1	1.81	2	3.31	6	3.34	1.
3. Toledo	11.81	8	7.16	4	0.98	6	1.51	5	3.11	9	1.58	4
4. Columbus	13.79	4	12.00	1	1.05	5	0.78	9	3.61	4	1.12	6
5. Dayton	12.07	7	6.54	5	1.19	4	1.03	7	3.57	5	1.16	5
6. Youngstown	13.43	5	4.47	8	1.37	3	1.13	6	3.74	3	0.79	8
7. Akron	14.08	3	4.79	7	0.93	7	1.76	3	4.01	2	1.10	7
8. Springfield	12.93	6	3.04	9	0.81	8	1.67	4	3.16	8	0.59	9
9. Canton	10.20	9	4.94	6	0.63	9	0.87	8	3.29	7	1.73	2
Total	\$15.07		\$9.07		\$1.37		\$1.55		\$3.72		\$1.92	

Judged by the per capita averages in Table IV B, which assigns first rank to Boston among the ten leading cities, as regards corporate payments for expenses, highways, schools, and interest, and second rank for expenses of outlays and police department, Boston's pre-eminence as to the costliness of her city government appears to be alike indubitable and unenviable. But there are countervailing considerations, as appears from Tables 23 and 30, whence the data of Table IV B are derived. Those tables clearly show that the per capita expenses of some other cities, for certain leading items, are quite as disproportionately great in comparison with those of the ten leading cities.

This is brought out quite clearly in the following tabular statements which seem to warrant the suggestion that high rank as regards per capita average payments for expenses does not of itself constitute sufficient and convincing evidence of extravagant government in the cities implicated. It is noteworthy that all of the cities included in the two lists of minor cities given above, excepting Washington, D.C., belong either to the North Atlantic or the Western Division of States. Not a single city belonging to the North Central Division is found in either list, while three cities of Massachusetts appear in the first and two in the second list.

The question arises whether the costs of city government in certain States or groups of States are not legitimately greater owing to the prevalence of a higher scale of prices for salaries, wages, and materials than in other States. Table VII shows the comparative cost of public schools for the cities of Massachusetts, Pennsylvania, and Ohio, respectively, its data being taken from Table 32 of the Census Report. Inspection of the per capita average payments for teachers' salaries in Table VII, renders it clear that the hire of teachers costs more in the cities of Massachusetts than in the cities of Pennsylvania or Ohio, although more satisfactory average salaries could be computed if the number of teachers in the several cities were given in the Report.

A. CORPORATE PAYMENTS FOR EXPENSES.

LEADING CITIES.

City.	Population.	Per Capita.
1. Boston	595,380	\$35.55
2. New York	4,000,034	25.95
3. St. Louis	636,973	20.33

MINOR CITIES.

1. Newton, Mass.	36,827	\$40.83
2. Pueblo, Col.	30,457	22.96
3. Washington, D.C.	302,883	22.61
4. Atlantic City, N.J.	37,593	21.87
5. Denver, Col.	150,317	21.61
6. Spokane, Wash.	45,313	21.41
7. Seattle, Wash.	99,586	20.84
8. Cambridge, Mass.	97,434	20.44
9. Portland, Me.	54,330	19.59
10. Lynn, Mass.	77,042	19.18

B. PAYMENTS FOR EXPENSES OF SCHOOLS.

LEADING CITIES.

City.	Population.	Per Capita.
1. Boston	595,380	\$6.20
2. New York	4,000,034	5.38
3. Cleveland	437,114	4.40

MINOR CITIES.

1. Pueblo, Col.	30,457	\$7.31
2. Spokane, Wash.	45,313	6.87
3. Salt Lake City, Utah	58,914	6.68
4. Newton, Mass.	36,827	6.47
5. Butte, Mont.	41,757	6.14
6. Springfield Mass.	73,540	5.80
7. Seattle, Wash.	99,586	5.69
8. Oakland, Cal.	72,670	5.61
9. Sacramento, Cal.	30,732	5.49
10. Yonkers, N.Y.	61,414	5.34

TABLE VII.—COMPARATIVE STATEMENT OF COST OF PUBLIC SCHOOLS, 1905.
A. CITIES OF MASSACHUSETTS WITH* POPULATION OF 30,000 OR MORE.

Name of City.	Population.	Cost of Operation and Maintenance.								Interest on Value of Buildings, Grounds, and Equipment.		Payments for Outlays.	
		Payments for Expenses.											
		Salaries of Teachers.		All Other.									
		Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.		
Boston	595,380	\$4,300,971	\$7.22	\$2,677,001	\$4.50	\$1,013,348	\$1.70	\$610,622	\$1.03	\$1,033,829	\$1.74		
Worcester	128,135	725,807	5.66	458,308	3.58	166,579	1.30	100,920	0.79	26,955	0.21		
Fall River	105,762	428,906	4.06	252,539	2.39	120,675	1.14	55,692	0.53	48,358	0.46		
Cambridge	97,434	574,374	5.90	366,011	3.76	125,351	1.29	83,012	0.85	128,313	1.33		
Lowell	94,889	458,773	4.83	234,222	2.47	157,821	1.66	66,730	0.70	34,868	0.37		
Lynn	77,042	350,943	4.56	190,179	2.47	74,527	0.97	86,237	1.12	21,583	0.28		
New Bedford	74,362	325,044	4.37	188,137	2.53	82,682	1.11	54,245	0.73	224,018	1.97		
Springfield	73,540	509,797	6.93	287,220	3.91	139,135	1.89	83,442	1.13	160,672	3.54		
Lawrence	70,050	299,931	4.28	161,375	2.30	57,320	0.82	81,236	1.16	54,981	0.78		
Somerville	69,272	388,151	5.60	254,674	3.68	77,498	1.12	55,979	0.81	53,015	0.77		
Holyoke	49,934	234,185	4.69	139,160	2.79	61,714	1.24	33,311	0.67	18,366	0.37		
Brookton	47,794	197,247	4.13	133,600	2.80	36,437	0.76	27,210	0.57	112,193	2.35		
Malden	38,037	227,041	5.97	133,397	3.51	59,881	1.57	33,763	0.89	22,122	0.58		
Haverhill	37,830	194,280	5.14	114,990	3.04	56,738	1.47	23,552	0.62	19,320	0.51		
Salem	37,627	159,204	4.23	195,922	2.55	41,777	1.11	21,505	0.57	3,227	0.09		
Chelsea	37,289	207,979	5.58	115,605	3.10	63,840	1.71	28,534	0.77	4,463	0.12		
Newton	36,827	290,809	7.90	173,416	4.71	64,763	1.76	52,630	1.43	42,622	1.16		
Fitchburg	33,021	149,455	4.53	83,715	2.54	39,708	1.20	26,032	0.79	10,287	0.31		
Taunton	30,967	144,372	4.66	83,906	2.71	41,758	1.35	18,708	0.60	21,890	0.71		
Total, 19 cities	1,736,192	\$10,167,269	\$5.86	\$6,143,377	\$3.54	\$2,480,532	\$1.43	\$1,543,360	\$0.89	\$2,041,072	\$1.18		

* Enumerated in 1905.

B. CITIES OF PENNSYLVANIA WITH * POPULATION OF 20,000 OR MORE.

Name of City.	Population.	Cost of Operation and Maintenance.										Payments for Outlays.	
		Aggregate.		Payments for Expenses.				Interest on Value of Buildings, Grounds, and Equipment.		Per Capita.			
				Salaries of Teachers.		All Other.							
		Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.
Philadelphia	1,417,062	\$5,421,738	\$3.83	\$3,358,551	\$2.37	\$1,539,541	\$1.09	\$523,646	\$0.37	\$1,137,077	\$0.80		
Pittsburg	364,161	1,702,606	4.68	937,418	2.57	525,188	1.44	240,000	0.66	601,217	1.65		
Allegheny	142,848	681,758	4.77	347,588	2.43	188,142	1.32	146,028	1.02	288,755	1.67		
Scranton	116,111	531,669	4.58	304,935	2.63	134,061	1.15	92,673	0.80	64,605	0.56		
Reading	89,111	309,113	3.47	177,912	2.00	76,849	0.86	54,352	0.61	123,972	1.39		
Erie	58,783	223,844	3.81	125,022	2.13	56,640	0.96	42,182	0.72	17,067	0.29		
Wilkesbarre	58,721	196,940	3.35	119,905	2.04	51,455	0.88	25,889	0.44	8,950	0.15		
Harrisburg	54,807	215,021	3.92	128,996	2.35	48,029	0.88	37,996	0.69	58,742	1.07		
Lancaster	46,184	125,024	2.71	61,992	1.34	35,984	0.78	27,048	0.59	71,798	1.55		
Altoona	45,567	180,758	3.97	99,509	2.18	45,729	1.00	35,520	0.78	162,888	3.58		
Johnstown	42,160	178,751	4.24	98,759	2.34	53,392	1.27	26,800	0.63	4,700	0.11		
McKeesport	42,024	179,399	4.27	101,350	2.41	45,994	1.09	32,055	0.76	65,515	1.56		
Allentown	40,571	134,894	3.32	76,107	1.88	29,290	0.72	29,497	0.73	10,463	0.26		
York	38,258	149,931	3.92	77,944	2.03	41,359	1.08	30,928	0.81	40,941	1.07		
Chester	37,338	130,615	3.50	72,085	1.93	34,172	0.92	24,358	0.65	2,555	0.07		
Newcastle	35,429	125,062	3.53	74,290	2.09	32,976	0.93	17,796	0.50	42,928	1.21		
Total, 16 cities . . .	2,629,120	\$10,487,132	\$3.99	\$6,162,063	\$2.34	\$2,938,801	\$1.12	\$1,386,268	\$0.53	\$2,652,173	\$1.01		

* Estimated in 1906.

TABLE VII.—COMPARATIVE STATEMENT OF COST OF PUBLIC SCHOOLS, 1905.—Continued.

C. CITIES OF OHIO WITH * POPULATION OF 30,000 OR MORE.

Name of City.	Population.	Cost of Operation and Maintenance.										
		Aggregate.	Payments for Expenses.						Interest on Value of Buildings, Grounds, and Equipment.		Payments for Outlays.	
			Salaries of Teachers.				All Other.					
			Total.	Per Capita.	Total.	Per Capita.	Total.	Per Capita.				
Cleveland	437,114	\$2,172,872	\$4.97	\$1,316,067	\$3.01	\$605,501	\$1.39	\$251,304	\$0.57	\$348,259	\$0.80	
Cincinnati	343,337	1,338,908	3.90	902,854	2.63	233,992	0.68	202,062	0.59	86,477	0.25	
Toledo	155,287	554,652	3.57	365,537	2.35	117,937	0.76	71,178	0.46	14,760	0.10	
Columbus	142,105	638,504	4.49	382,167	2.69	130,476	0.92	125,861	0.89	78,093	0.55	
Dayton	98,350	417,580	4.25	264,719	2.69	86,577	0.88	66,284	0.67	18,885	0.19	
Youngstown	51,516	258,075	5.01	116,037	2.25	76,998	1.49	65,040	1.26	4,000	0.08	
Akron	49,403	241,777	4.89	119,094	2.41	79,033	1.60	43,650	0.88	24,035	0.49	
Springfield	41,433	174,059	4.20	103,852	2.51	26,967	0.65	43,240	1.04	11,512	0.28	
Canton	37,907	148,717	3.92	89,136	2.35	35,601	0.94	23,980	0.63	—	—	
Total, 9 cities	1,356,452	\$5,945,144	\$4.38	\$3,659,463	\$2.70	\$1,393,082	\$1.03	\$892,599	\$0.65	\$586,021	\$0.43	

* Estimated.

The per capita averages for corporate expenses, police, highways, and schools for cities of Massachusetts are shown in Table V to be considerably greater than for the cities of Ohio, as set forth in Table VI.

So far as the data afforded by the Census Report go, the most accurate criterion available for determining the scale of salaries in force in cities with 30,000 or over of population is the per capita average payment for teachers' salaries. Accordingly, in Table VIII, the cities reported as paying the twenty highest per capita rates for teachers in the public schools are arranged in descending order. It is highly significant that, of the twenty-two cities included in the table, nine belong to the Western and ten to the North Atlantic group of cities; and that, of the ten North Atlantic cities, six cities besides Boston are situated in Massachusetts. The rank of the Western and Massachusetts cities, in respect to payments for corporate purposes and police department, as well as the average salaries of police employees, is also high. It seems to be fairly certain that the enhanced cost of city government in the States of Massachusetts, California, and Washington, is partly owing to the existences of a higher scale of salaries and wages in these States than obtain in most States.

Tables showing the salaries paid to certain officials—*e.g.*, mayors, members of the City Council, chiefs of police, and the superintendents of schools—would be a welcome addition to the census reports on the statistics of cities.

The figures showing the rank of cities according to their per capita average payments for corporate expenses or for selected objects of expenditure, all tell one and the same story, whether one scrutinizes the tables relating to the ten leading cities in Group 1 as in Tables III and IV, or cities grouped according to State lines, as in Tables V and VI, or cities grouped as in Table VIII, according to per capita payments for teachers' salaries. In each case it is evident that the figures showing rank as to payments do not correspond closely with the rank of the same cities in respect to population. It is noticeable, too, especially in the case of the cities of Ohio (which are organized

under a definite municipal code, and are required by law to keep their accounts and render their financial reports in accordance with a uniform system prescribed by the State Auditor), that there is a nearer approach to parallelism between the absolute figures showing payments and the population figures.

TABLE VIII.—COMPARATIVE STATISTICS OF CITIES HAVING HIGHEST PER CAPITA PAYMENTS FOR SALARIES OF TEACHERS.

Name of City.	Per Capita Payments.						Average Salaries of Police Employees.	Rank.	Rank in Population.
	Teachers' Salaries.	Rank.	Corporate Payments, Expenses.	Rank.	Police Department.	Rank.			
Pueblo, Col.	\$5.14	1	\$22.96	4	\$1.63	8	\$913	13	22
Newton, Mass.	4.71	2	40.83	1	1.92	5	1,036	8	19
Spokane, Wash.	4.56	3	21.41	7	1.13	18	1,027	9	16
Salt Lake City	4.51	4	19.36	10	1.19	16	997	11	14
Boston, Mass.	4.50	5	35.55	2	3.23	2	1,150	3	2
Oakland, Cal.	4.34	6	16.01	21	1.51	10	1,254	2	11
Butte, Mont.	4.27	7	16.95	19	2.23	4	1,105	5	17
Denver, Col.	4.25	8	21.57	16	1.40	12	930	12	5
Sacramento, Cal.	4.25	8	18.27	4	0.91	20	625	21	21
New York City	4.06	9	25.95	3	3.34	1	1,282	1	1
Seattle, Wash.	3.92	10	20.84	8	1.29	14	762	18	7
Springfield, Mass.	3.91	11	18.38	13	1.30	13	887	15	10
Kansas City, Mo.	3.78	12	18.06	15	1.86	6	817	17	4
Cambridge, Mass.	3.76	13	20.44	9	1.56	9	999	10	8
Washington, D.C.	3.70	14	22.61	5	3.09	3	1,049	7	3
Somerville, Mass.	3.68	15	16.61	20	1.15	17	1,089	6	12
Worcester, Mass.	3.58	16	16.97	18	1.27	15	899	14	6
Malden, Mass.	3.51	17	17.96	16	0.94	19	856	16	18
Yonkers, N.Y.	3.45	18	18.77	12	1.65	7	1,124	4	13
Tacoma, Wash.	3.43	19	19.05	11	0.90	21	684	19	15
Hartford, Conn.	3.35	20	17.38	17	1.48	11	616	22	9
Racine, Wis.	3.35	20	10.72	22	0.41	22	680	20	20

The following comparative statement for cities of 37,000 and 30,000 inhabitants also shows marked variations within each group, both in absolute and relative figures, as respects payments for the same objects, although the cities in each group differ but slightly from each other as to population. Among 154 cities, the largest group of cities having the same round number of inhabitants numbers eight. It includes all cities

COMPARATIVE STATEMENT OF CITIES OF 37,000 AND 30,000 INHABITANTS.

A. ABSOLUTE AND PER CAPITA FIGURES.

Name of City with Rank in 154 Cities.	Corporate Payments.				Teachers' Salaries.			
	Expenses.	Rank.	Per Capita.	Rank.	Amount.	Rank.	Per Capita.	Rank.
122. Canton, Ohio . . .	\$386,501	6	\$10.20	6	\$89,136	6	\$2.35	6
123. Passaic, N.J. . . .	362,658	7	9.58	7	110,788	4	2.93	4
124. Haverhill, Mass. . .	605,672	2	16.01	3	114,990	3	3.04	3
125. Topeka, Kan. . . .	459,992	5	12.22	5	123,233	1	3.27	1
126. Salem, Mass. . . .	571,465	4	15.19	4	95,922	5	2.55	5
127. Atlantic City, N.J. .	822,113	1	21.87	1	79,589	7	2.12	7
128. Chester, Pa. . . .	268,905	8	7.20	8	72,085	8	1.93	8
129. Chelsea, Mass. . . .	602,988	3	16.17	2	115,605	2	3.10	2
Total	\$4,080,294		\$13.55		\$801,348		\$2.66	
Average	510,037				100,168			
149. Taunton, Mass. . . .	\$517,551	3	\$16.71	3	\$83,906	3	\$2.71	3
150. Sacramento, Cal. . .	561,377	2	18.27	2	130,748	2	4.25	2
151. Oshkosh, Wis. . . .	308,623	5	10.09	5	79,546	4	2.60	4
152. Pueblo, Col. . . .	699,216	1	22.96	1	156,633	1	5.14	1
153. New Britain, Conn. .	309,003	4	10.24	4	48,169	5	1.60	5
Total	\$2,395,770		\$15.69		\$499,002		\$3.66	
Average	479,154				99,800			

B. MARKED ON SCALE OF 100 FOR POPULATION, PER CAPITA EXPENSES, ETC.

Name of City with Rank in 154 Cities.	Population.		Corporate Payments.		Teachers' Salaries. ¹	
	Number.	Mark on Scale of 100.	Per Capita.	Mark on Scale of 100.	Per Capita.	Mark on Scale of 100.
122. Canton, Ohio . . .	37,907	101.66	\$10.20	141.66	\$2.35	121.80
123. Passaic, N.J. . . .	37,837	101.47	9.58	133.05	2.93	151.85
124. Haverhill, Mass. . .	37,830	101.45	16.01	220.23	3.04	188.60
125. Topeka, Kan. . . .	37,641	100.94	12.22	169.72	3.27	169.40
126. Salem, Mass. . . .	37,627	100.90	15.19	210.97	2.55	132.18
127. Atlantic City, N.J. .	37,593	100.81	21.87	303.75	2.12	109.84
128. Chester, Pa. . . .	37,333	100.12	7.20	100.00	1.93	100.00
129. Chelsea, Mass. . . .	37,289	100.00	16.17	224.58	3.10	160.63
149. Taunton, Mass. . . .	30,967	102.61	16.71	165.61	2.71	169.37
150. Sacramento, Cal. . .	30,732	101.84	18.27	181.07	4.25	265.62
151. Oshkosh, Wis. . . .	30,575	101.31	10.09	100.00	2.60	162.50
152. Pueblo, Col. . . .	30,457	100.92	22.96	227.55	5.14	321.25
153. New Britain, Conn. .	30,178	100.00	10.24	101.49	1.60	100.00

with a population between 37,000 and 38,000. There are several groups of five cities, each having an equal number of inhabitants in round numbers; *e.g.*, those having 30,000 to 31,000, those with 38,000 to 39,000, those with 42,000 to 43,000, and those with 58,000 to 59,000. We have compiled the data only for the five cities with 30,000 to 31,000.

It seems tolerably clear from the tables presented in this article that the number of its inhabitants is not the controlling factor in respect to a city's rank as regards corporate payments for expenses or as regards payments for the leading objects of expenditure. It seems probable that an important factor in the marked variations we have considered may be found in the unequal purchasing power of money as regards services and materials in different sections of the country. But the most influential factors in producing the apparently inexplicable variations in the amounts of total and per capita payments of the several classes set forth by the Bureau of the Census in the "Statistics of Cities for 1905" are, doubtless, to be found in the diversity of organization and variety of administrative methods which, at present, characterizes the governments of American cities.

At any rate, that is the conclusion reached by the Bureau of the Census, and stated in the text which precedes the tables from which we have compiled the tables presented in this article. Thus, in the discussion of the purpose and scope of "Financial Statistics," we read on page 7 that "the statistics are affected both by the very great differences in the organization of American cities for local self-government and by the kind of accounts kept." And again, on page 79, in a passage already quoted, after noting "the great differences shown by different cities in the amounts of total and per capita payments and receipts of the several classes," it is stated that "the causes of many such variations were pointed out in a general way on page 21 of Census Bulletin 20, but no special investigation has been made for any particular city or group of cities given in this report. In the case of most of the cities the variations in per capita payments and receipts reflect differences in municipal organi-

zation or administration." To whom can we look but to the Bureau of the Census for a trustworthy description of those differences, and for a convincing demonstration of their influence upon the financial statistics in which "the Bureau of the Census seeks to present such data as will admit of ready comparison between the several cities"? It is the lack of such description and demonstration which now renders the "ready comparison" of cities, except in an intra-tabular way, so ticklish a matter for the man in the street and the man on the stump.

We venture to think that the value of the Census Tables would be enhanced and their usefulness become more evident alike to the plain citizen, the fiscal officer, and the student of statistics, if more and fuller analytical and interpretative studies were introduced into the text which precedes the tables.

The present report contains a number of features which render it more complete and useful than the report for 1902 and 1903 (Bulletin 20) or the report for 1904 (Bulletin 50). Certain new tables, particularly the "Comparative Summaries for 148 Cities, 1902 to 1905," have already been mentioned. Another new and instructive table is "Table 9. Payments for Outlays, Classified by Resources from which Paid, and by Departments, Offices, Accounts, and Industries." Other new features are: an index of ten pages; an Introduction, pages 7-44, devoted to an exhaustive discussion of the principles of Commercial and Governmental Accounting, which will repay careful study; "Table 36. Arrests of Children, Classified by Offense; Table 37. Juvenile Courts and Disposition of Juvenile Offenders; Table 38. Licensed Dealers in and Manufacturers and Bottlers of Intoxicating Liquors;" and an instructive special study by M. N. Baker, associate editor of the *Engineering News*, entitled "Sewerage and Sewage Disposal."

As it stands the series of reports issued by the Bureau of the Census for the years 1903-05 constitutes an invaluable and unique source of information on the statistics of cities.

REVIEWS.

School Reports and School Efficiency. By Professor David S. Snedden and Dr. William H. Allen. Published by the Macmillan Company.

This compact volume is a book with a definite practical purpose. The study, which was made for the New York Committee on Physical Welfare of School Children, points the way for such an organization of educational statistics as shall give adequate publicity to school facts and promote efficiency in school administration. The authors have done their work with commendable thoroughness, discrimination, and judgement. Their book is a mine of useful information, criticism, and suggestion for school administrators, teachers, and citizens. It can hardly fail to accomplish substantial results in stimulating interest, discussion, and reform in the field of public education.

The need of reform in the methods of collecting and presenting educational statistics will not be questioned by any one having even slight acquaintance with school reports. At present the bulk of educational statistics cannot be said to serve any useful purpose whatever. Much of this statistical output represents waste of money, effort, and printer's ink. A deal of dead matter is published year after year, the original reason for its publication having long ceased to exist. Hence school reports contain many tables which are not consulted by any one. Moreover, matter that would otherwise be useful is frequently presented in such form as to be largely unintelligible. The figures are not accompanied by the analysis and interpretation required to bring out their meaning. These dark forests of figures repel unprofessional explorers. Laymen need expert guidance in order to find their way through the statistical woods. This the school reports fail in most cases to give. It is not surprising, therefore, that the ordinary citizen pays no attention whatever to educational statistics.

The shortcomings of school reports are particularly conspicuous in reference to the new educational experiments which are being tried on every hand. In recent years the schools have undertaken a wide variety of new activities. Such are the evening and vacation schools, school playgrounds and gardens, medical inspection, educational centres, and the like. In this social expansion of the school system the intelligent co-operation of the public is of the greatest importance. It is essential to the proper direction of these educational ventures that the comparative

costs and results of the various undertakings be definitely known. The tax-payers have a right to know what these experiments are severally costing and whether the results are commensurate with the expenditures. It is possible that the schools are doing too many things that benefit only a few persons, and that they might better confine their activities to a few things that would benefit many persons. The needed information ought to be supplied by the school reports.

The fact-study by Professor Snedden and Dr. Allen shows how educational statistics may be organized to meet the end just indicated. These experts discovered no single report that would serve as a working model. They found some excellent features in many of the hundred or more reports which they examined, but they declare that "even the best of the reports, however, leave many questions unanswered, and few of them have undertaken to apply modern or scientific statistical methods. Apart from the few best reports it must be said that the majority of the reports fail conspicuously to provide statistical information either to the layman or to the administrator. They illustrate a striking phase of inefficiency in American municipal administration." The authors of the book rightly maintain that the published school report should be regarded essentially and primarily as a communication from the school authorities to the public, and should be planned in such a way as to inform and interest the public with a view to securing support for progressive methods of school administration. By exhibiting the best methods in use they supply the material which school authorities can utilize in devising a form of report adapted in each case to meet local needs as regards publicity and efficiency.

The eight chapters of the book treat of the following topics: The purposes of educational statistics, the beginning of school reports in American cities, efforts of the National Educational Association to improve school reports and to secure uniformity, examples of tables and other forms of presenting school facts used in typical city school reports, important questions not answered by existing reports, suggested economies and improvements for school reports, a practical study of one school report, New York City.

The most suggestive chapter is that enumerating the questions not answered by existing reports. This list brings into striking relief the failure of educational statistics to measure up to the requirements of publicity and efficiency. Most reports furnish little or no statistical data regarding the working of the newer educational experiments. For example, among the questions relating to medical inspection, vacation schools, and playgrounds never answered are these: What is the cost of medical inspection, and what for each unit of work? What proportion of children need medical care? What proportion of children backward in studies or over-age owe this condition to physical defect? What

is the effect upon school progress of removing physical defects? How many physicians and how many nurses are needed to do thoroughly for all children in all schools what is being done for a few children in a few schools? How much would their work cost? How much would they save? What is the character of attendance at vacation schools, distributed as to duration or persistency, classes of children, kinds of work taken, etc.? What are the results of such attendance? How many more vacation schools are needed? What would it cost to give all children in the city the privileges now confined to a few?

It is obviously not necessary or desirable that full statistical information on the preceding questions and the many others suggested in the book be incorporated in each annual report. Such information should be gathered regularly, but need not be published annually. In this connection three broad principles of economy are laid down by the authors for the guidance of officials in preparing reports. The first is that only such data shall be collected and such reports prepared as will tend to answer questions bearing on educational efficiency and serve the purposes of school administration either directly or through the indirect means of publicity. The observance of this principle would eliminate useless data that now lumber up the reports. Another principle is that the primary data of the reports—the facts furnished by teachers and other workers—should be collected and treated by the most approved methods and devices of statistical science. Many of the forms now used by teachers in making original records are cumbersome and wasteful of time. The third principle calls for discrimination in regard to the publication of statistical tables in school reports. Annual publication is not called for in all cases. For some types of information biennial, triennial, or even less frequent publication would suffice. The frequency of publication should be determined by the nature of the statistics and the object of presentation.

These suggestions and the others embodied in the book merit the attention of school authorities everywhere. At present school reports are as uninviting and unrewarding to explore as the scriptural valley of dry bones. The constructive criticism of Professor Snedden and Dr. Allen indicates ways and means by which the dry bones may be vitalized. These critics show how educational statistics may be transformed from a forgotten factor in the school system to an effective agency of educational progress. It is a timely service thus to apply to problems of school administration the new principles of statistical recording and reporting which are being employed to secure publicity and efficiency in many branches of the public service.

F. SPENCER BALDWIN.

Mortality Statistics, 1906. Report of the Bureau of the Census, Washington, D.C., 1908.

This is the seventh annual report and the third separate volume issued by the Bureau of the Census under the title of "Mortality Statistics." The first five annual reports were included in one volume, published in 1906; the statistics for 1905 constituted the second volume, which was published in 1907; and the present report for 1906 was available for distribution in the early part of the current year. The mortality report for 1905 contained about 360 pages, and the 1906 report has expanded to 480 pages, including about 20 pages of introduction, 50 pages of textual analysis, and 30 pages of appendices. The 1906 report, therefore, contains more pages of solid tabular matter (380) than were included in the whole report for 1905. If, as the Director of the Census hopes, this mortality volume is ultimately to be issued within six months of the close of the calendar year for which the statistics are compiled, the problem to be solved is how to exclude the data of least importance and include those of greatest importance. The report must not be so big and complex that it cannot be prepared in a reasonable space of time, nor should valuable tables and data be sacrificed for the sake of early issue. It seems to the writer that the present bulk of the report could be materially reduced without the sacrifice of valuable data, while much information of great importance, not yet obtainable in the volume, ought ultimately to find a place there. For example, if the Summary and Rate,—Table IV, were limited to rates for the last year and the average rates for the previous five years, or a standard five years, a table which now occupies 102 pages would be reduced at least one-half, and at the same time it would perhaps serve a more useful purpose. On the other hand, certain fundamental information ought to be added.

A more convenient abstract of the summary results of mortality for the year should be given a prominent place in the first part of the volume. This table should give the population dealt with and the deaths in the aggregate and in their main constituent parts, or divisions, by color, nativity, etc., with the corresponding death-rates. In the present volume, for example, the reader must look on page 21 to find that 41,508 negro deaths were considered in 1906, while the corresponding estimated negro population is not given, although the negro population in 1900 for the *registration States*, as constituted in 1906, is found on page 10. This figure, however, does not include the negro population of *registration cities* in non-registration States.

Mr. Hoffman has suggested a table which would give the mortality record, at least for the registration area as a whole, by single years of life, with distinction of sex, color, and general nativity.*

* See "Practical Suggestions for Improving Vital Statistics," by Frederick L. Hoffman, December, 1907, number of these publications, p. 424.

It is to be hoped, also, that the Bureau of the Census can soon see its way clear to tabulate the Indian, Japanese, and Chinese mortality by causes of death, with distinction of sex and age, precisely as the mortality for the whole registration area is now tabulated in General Table 6, pages 354-361. Such tables would require only eight pages for each race, and they would yield data of great value. Ultimately, some at least of the principal nativities should be tabulated in the same manner,—notably the Irish, Germans, Italians, Hungarians, French Canadians, Scandinavians, etc. The mortality data would be of considerable value without reference to population, and, with the publication of the population statistics as determined by the next census, the death returns by race and nativity, with distinction of sex, age, and causes of death, would be of immeasurable value for a large variety of purposes,—legislative, sociological, and other.

It is gratifying to be able to record progress both in the form and in the substance of the mortality statistics of 1906 as compared with the two previous volumes. The registration area for 1906 embraced 48.8 per cent. of the total population of the continental United States, as compared with 40.9 per cent. in 1905. The States of California, Colorado, Maryland, Pennsylvania, and South Dakota, were added in 1906. The estimated addition in population was 6,698,190, of which 598,273 was urban, and 6,099,917 rural. The number of deaths in the registration area in 1906 was 658,105, of which 358,286 were males and 299,819 females; by nativity, 441,096 were natives and 162,364 were foreign born, the nativity of 10,609 being reported unknown; and, by color, 614,869 were white, 41,508 negroes, 1,118 Indians, 917 Chinese, 478 Japanese, 5 Hawaiians, 3 Koreans, 3 Filipinos, 2 East Indians, 1 Tahitian, and 1 Hindoo.

The annual death-rate in the registration area as a whole in 1906 was 16.1 per 1,000 of population; in the registration cities it was 17.2; and, in the rural area, 14.1. In 39 specified cities in which the colored element (mostly negroes) numbered 10 per cent. or more of the total population according to the census of 1900, the aggregate white death-rate in 1906 was 17.2 per 1,000 of population, and for the five years 1900-05 it was, on the average, 17.5. The death-rate of the colored element in 1906 in the 39 cities combined was 28.1, and averaged 28.4 for the previous five years. The colored death-rate was about 60 per cent. in excess of the white death-rate both in 1906 and, on the average, during 1901-05.

The comparative death-rates of the white and colored elements of the population of the specified localities by principal causes of death are available in Summary and Rate Table IV, pages 88-157. Convenient comparisons are also made in the textual analysis. The statistics show that the colored death-rates are in excess of the white from typhoid fever, malarial fever, whooping-cough, consumption, respiratory diseases, nervous diseases, circulatory diseases, digestive diseases, and urinary diseases. On the other hand, the colored element (mostly negroes) is some-

what less liable to death from scarlet fever, diphtheria and croup, cancer, and suicide. An excellent comparative summary of the white and negro mortality in the aggregate and by causes of death has been made by Mr. F. L. Hoffman in the *Spectator*, an insurance weekly published in New York. The summary was based upon the "Mortality Statistics, 1906," and may be found in the *Spectator* of May 21, 1908.

General Tables 1, 2, and 3 have been very materially improved for practical purposes in "Mortality Statistics, 1906." In the previous annual reports the registration cities in these tables were arranged in alphabetical order without reference to State grouping. In the present report the cities are arranged alphabetically under the States, which are also in alphabetical order. Now, if the student or reader wants to make comparison of the mortality in contiguous cities or groups of cities, this can be done much more readily than heretofore. This same admirable arrangement of the registration cities has been adopted also in the Summary and Rate Tables I, II, and IV.

Another improvement to be noted in the quality of the contents of the "Mortality Statistics of 1906" is the separation of the Chinese and Japanese mortality in the General Table 4, pages 320-324. The mortality for these races is now available, with distinction of sex and age, for the main divisions of the registration area.

These annual reports of mortality are of the greatest possible value to statisticians, sanitarians, legislators, workers in the various fields of sociological research, and to all persons in the least interested in vital statistics. Any suggestions for improvement that will make the volumes of greater value or more readily workable will, undoubtedly, receive serious consideration and be adopted, if deemed practical, at the earliest possible moment; for Dr. Cressy L. Wilbur, the chief statistician of the Division of Vital Statistics, is deeply interested in bringing these reports to a high degree of accuracy and completeness. Those who make daily use of the volumes can best appreciate their present value, and are, perhaps, most anxious for their quick improvement in some particulars. The few suggestions here set forth are made in a spirit of helpfulness and not in a spirit of captious criticism.

F. S. CRUM.

Prisoners and Juvenile Delinquents in Institutions, 1904. Special Report, Bureau of the Census, Washington, D.C., 1907.

The investigation upon which this report is based was planned by Dr. Roland P. Falkner, but the treatment of the statistical material collected and the analysis of the results was the work of Mr. John Koren. In a cursory review of a comprehensive report of this character it is impossible

to do more than briefly allude to a few of the many things contained therein which must prove to be of special value to students of criminology and to practical workers in penal institutions. The report embraces nearly 300 pages, and it is filled with interesting facts from cover to cover. It charts in an admirably clear and concise manner the geographical distribution of adult criminals and juvenile delinquents in the penal and reformatory institutions of the United States.

Distinction is made of sex, color, nativity, age, crime or offence for which committed, kind of sentence imposed, length of term of commitment, previous occupation, literacy, conjugal condition, etc. The tabulation of these various series of facts has been done so well that no criticism of the form of the tables or their heading, would appear to be necessary or desirable.

Every superintendent, warden, principal keeper, or other person responsible for the care and keeping of prisoners, should be interested in this report. It should also prove of exceptional value to those whose business it is to prepare the annual or biennial reports of jails, penitentiaries, prisons, and reformatories. This report in many particulars of classification and tabulation of facts should furnish compilers of institutional reports valuable clues for the improvement of their own methods of presenting the facts in the experience of their institutions.

This report on prisoners and juvenile delinquents not only presents the facts revealed by a census enumeration of these special classes of the population, but it does much more, and for the first time a serious effort is made to measure the force of the current of crime in the United States, so far as this is possible by a statistical study of the movement of the prison population through a period of one year. It is one thing to compare census enumerations of prisoners, separated by a period of ten years, but it is quite another and, perhaps, more important thing to learn how the prison population changes in the course of a given year. This report, it seems to me, shows very clearly that a study of commitments and discharges of prisoners is more valuable than a mere enumeration of prisoners on a given date; for we see the prison population in its dynamic aspect, which is certainly quite as important as its static aspect.

No one at all interested in criminology can afford to do without this report. The layman as well as the special student can readily find the facts wanted, for the volume is made easily workable by a comprehensive index of nine pages. As the report can be obtained for the asking, it does not seem necessary or desirable to present here even a partial list of the more important detailed facts contained therein. These can best be understood if studied in correlation with each other, and no reviewer could hope to present them in this manner any better than has been done in the tables and textual analysis of the report itself. F. S. C.

Annuário de Estatística Demographo-Sanitária, Rio de Janeiro, Brazil.
By Dr. Sampaio Vianna. (For the year 1906, and published in 1907.)

This annual volume, like its predecessors, is a goodly-sized document of some three hundred pages, which sets forth the essential facts relating to the vital statistics of Rio de Janeiro with some summary tables for certain other of the more important cities of Brazil. These annual reports should be of special interest to students of vital statistics, as they contain facts pertaining to a large population located in the tropics and to a city which, in the immediate past, has had a bad reputation because of its high mortality from yellow fever and other diseases more or less peculiar to tropical climates.

A summary of the meteorological data for 1906 forms the first page of the report proper, and the second page contains a summary statement of the exact location, altitude, area, and geographical divisions of the federal district or greater city of Rio de Janeiro. This method might well be adopted by our own larger American cities, some of which do not clearly define in their health or other reports the exact limits to which the reports refer or give the areas of the subdivisions of the city, such as wards, assembly districts, etc.

The movement of the population of Rio de Janeiro is briefly discussed, and the more important facts relating to immigration and emigration are clearly set forth with distinction of nativity and whether the migratory movement was by railroad or by water. Some of these facts are illustrated by a graphic display, opposite page 15, by means of rings within rings and rings interlinked. This kind of graphics does not appeal to the writer as being the best suited to represent a sober fact or series of facts more clearly than figures can do. There are other offences of the same kind in the volume, and perhaps the most notorious are those given opposite page 59, where the comparative mortality rates of Rio de Janeiro and other important cities of the world are represented by mountain peaks. Artistic imagination, it seems to the writer, is out of place, when used in this way. The diagram opposite page 18 is not quite so bad as the others referred to, but the comparative statement of the marriages, births, and deaths could have been somewhat more clearly shown either by parallel vertical bars of even width and different colors or by the simple curves so familiar to students of statistics. A new form of diagram, unless distinctly better than an old one, should be avoided. A fine bit of color or an elaborate display of form in the figure often interferes with the essential function of the diagram. Emphasis is placed upon this important matter because such efforts are altogether too frequent in statistical reports, and graphics are too important an aid to statistics to warrant their prostitution by imaginative compilers of statistics. There are some very fine examples of diagrams and cartograms in the

volume here under discussion, notably the diagrams opposite page 66, which illustrate the comparative daily mortality from yellow fever in six different years, and the cartograms showing the distribution of cases of yellow fever, smallpox, pest, and diphtheria in Rio de Janeiro during the year 1906.

It would be impossible in a brief space to even allude to all of the interesting facts contained in this report. Among others, however, the following are of quite exceptional interest and importance. One chapter of six pages is devoted to a brief discussion of the still-births in Rio de Janeiro with some international comparisons. The proportion of the still-born to total births is quite high in Rio de Janeiro, or 70.2 still-births to every 1,000 total, against 28.5 for Budapest and 31.2 for Moscow. On the other hand, in Tokio the proportion in 1901 was 78.8, and in Paris in 1905, 84.1.

The general death-rate in the city of Rio de Janeiro during 1906 was 22.31 per 1,000 of population; in the suburbs it was 15.46; and in the federal district as a whole, 20.74. As recently as 1904 the general death-rate of the federal district was 28.66. The infant mortality (ages under one) in Rio de Janeiro seems to compare favorably with that of other large cities. The mortality by age and nativity can be worked out in detail from the tables presented in the report.

Of the causes of death the most important, locally, has always been yellow fever until as recently as 1902, when scientific efforts were first made to eradicate that scourge and with almost immediate good effects. Working on the mosquito theory, the present efficient local Board of Health has succeeded in almost clearing the city of yellow fever. In 1906, for example, there were but 42 deaths from that cause in the city of Rio de Janeiro, although the average annual number of deaths from that disease during the twenty-six years previous to 1903 was over 1,300.* The fight against smallpox is also showing good results, and there were only 9 deaths from that cause in 1906 against 3,566 in 1904, 1,414 in 1901, and 1,395 in 1899. These good results, judging from the weekly reports of the United States Marine Hospital Service, have continued during 1907.

It will be interesting to note whether the present progress in sanitation will be sustained in Rio de Janeiro. This will, of course, be necessary if the present conditions are to improve; and continued active efforts and great vigilance will be required to keep the city free from yellow fever and other contagious diseases. Malarial fevers also are still altogether too common, and progress in other sanitary directions, particularly in improved drainage, should result in a material reduction in the mortality from this class of fevers. The pest, or plague, and smallpox,

* For a very useful summary of progress in sanitation in Rio de Janeiro, see Part I of the Weekly Public Health Reports of the United States Marine Hospital Service, 1907, pp. 363 *et seq.*

if combated by the most modern and scientific methods, should ultimately be practically eliminated from the local mortality.

Containing, as it does, a considerable number of American residents, and, as one of the most important ports of South America, in constant communication with the ports of the United States, the health and sanitary conditions in Rio de Janeiro are of especial interest to this country. It is a fact deserving of sincere congratulation, therefore, that the present outlook for an at least normally healthful city is so bright in the metropolis and commercial emporium of Brazil.

F. S. C.

AMERICAN STATISTICAL ASSOCIATION.

NEW SERIES, No. 83

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A STATISTICAL STUDY OF INFANT MORTALITY.

BY EDWARD BUNNELL PHELPS.

Considerably more than a generation ago (in 1865), Dr. Farr brought the subject of Infant Mortality before the [Royal] Statistical Society, and frequently discussed it in his historic contributions to the annual reports of the Registrar-General's office. On December 19, 1893, Dr. Hugh R. Jones read before the Royal Statistical Society an exhaustive paper on "The Perils and Protection of Infant Life," which had the distinction of being the Howard Medal Prize Essay of that year. In the interim of more than forty years since Dr. Farr inaugurated the statistical discussion, so to speak, infant mortality has been a prolific subject in medical works and journals, has received perennial treatment in the reports of practically all bureaus of vital statistics, and the bibliography of the subject even up to ten years ago would constitute quite an impressive library, were all the papers on, and extended references to, this particular phase of human mortality assembled and properly indexed.

In a general way, however, it may be said that only within the last few years has the topic been presented in such a light as to attract serious attention at the hands of the public at large, the discussion up to the end of the nineteenth century having practically been restricted to medical men, government officials, and professional statisticians. To be sure, as early as 1876 a Society for Nursing Mothers was established in France, and pro-

vision thus made on a small scale for caring for destitute mothers immediately before and after childbirth. The *Crèches* of France and the *Krippen* of Germany, or day nurseries, in part supported by private charity and in part by State or municipal aid, long since became well-known institutions. For many years both Germany and Switzerland have had laws prohibiting women from working in factories for certain periods before and after confinement, and providing for their partial support during those periods of compulsory idleness; and Section 61 of the Factory and Workshop Act (of 1901) of Great Britain enjoins factory employers from knowingly allowing women to work in their factories within four weeks of childbirth.

Furthermore, some fifteen years ago Nathan Straus began the establishment of his milk depots in New York City with a view to supplying pasteurized milk at nominal price for children's use, and since then the plan introduced by Mr. Straus has been copied in various quarters. But all of these institutions of nineteenth-century origin were the outcomes of individual realization of the growing importance of the problem of infant mortality, rather than of a public appreciation of its far-reaching bearing on the future of the race, and their establishment in no way controverts the previous statement that practically only since the dawn of the twentieth century has the subject been so brought forward as to attract serious attention at the hands of the thinking public.

The fact that such an era has now arrived is due to a variety of causes. In the first place, even the most pronounced cynic, if he be a well-informed and reasoning person, must admit that the community at large has begun to take more interest than ever before in "how the other half lives." So obvious and indisputable a truth calls for no demonstration, and the growing interest in "how the other half dies" is an inevitable corollary of the ascending interest in how the unfortunate or less fortunate section of the community lives. Perhaps this general development of the humanitarian instinct is primarily responsible for the civilized world's awakening to the appalling conditions of infant mortality. Men are beginning to realize

that the caste lines once so rigidly drawn between the various classes are, like most national boundaries in one sense at least, purely imaginary lines, and that the health and welfare of any one section of the community directly concern the health and welfare of the community at large. As Dr. Margaret Alden so well puts it in her very recent work on "Child Life and Labour," in the chapter on infant mortality (p. 16): "A thorough understanding of the subject should be the concern of every true citizen for three reasons: 1. Because such a wastage of human life is a loss of the nation's best capital. 2. Because the conditions which make for the death of infants, make also for disease. 3. Because this question appeals to us on humanitarian grounds."

By way of secondary, indirect, cause for the general dawning interest in the subject, probably the material advance in medical knowledge and in established principles of hygiene and sanitation has played the most important part. As an immediate result of this advance has come the gradual decrease in the general death-rate of recent years in practically all civilized countries, but as Dr. George Reid, Medical Officer to the Staffordshire County Council, points out in his contribution to the cyclopedic work on "Dangerous Trades" in the paper on "Infantile Mortality and Factory Labour" (pp. 84-85): "Although a steady decline has taken place in the general mortality of the country coincident with, and, no doubt, in the main, consequent upon sanitary progress, it cannot be said that the infant mortality has diminished in like proportion." That fact has been so generally noted, and so repeatedly emphasized, by both physicians and statisticians, that it could scarcely have failed to make at least some impression on the public mind. And now that it has been so graphically stated, as, for instance, in H. Llewellyn Heath's recent book on "The Infant, the Parent, and the State," small wonder is it that thoughtful people of all classes are beginning to realize that it is high time some united action were taken with a view to devising remedies for so anomalous a situation.

Mr. Heath's indirect indictment of the previous apathy on

the subject, on the first page of his book, is put in this blunt way: "In the year 1904, England lost 137,392 of her children before they had reached the short span of twelve months of life. The deaths of these infants constituted 25 per cent. of all the deaths in England and Wales during the year we are considering. Geneva has kept registers of births, marriages, and deaths since 1549. In the sixteenth century their infant deaths constituted 25.9 per cent. of their total deaths at all ages." In other words, as Mr. Heath thus makes clear, despite all the hygienic and sanitary progress of modern times, and despite the marked decline in the general death-rate, the ratio of infant mortality to total mortality remains practically the same in England and Wales to-day as it was in Geneva nearly three hundred and fifty years ago; and, it might be added, present conditions in the United States are only slightly better, the ratio of infant deaths to deaths at all ages in the registration States of this country in the last census year, as is shown in one of the tables accompanying this paper, having been no less than 20.06 per cent. as compared with Geneva's percentage of 25.9 more than three centuries ago.

The general tendencies in the direction of an increased public interest in the subject of infant mortality, above briefly outlined, of course have been materially supplemented and intelligently directed by the more or less frequent contributions to the discussion of Dr. Farr, Dr. Bertillon, Dr. Newsholme, Sir John Simon, Dr. Greenhow, Dr. Reid, Dr. Newman, and other statisticians and physicians; and so it happens that in the last three years no less than five congresses have been held in various European countries with a view to grappling seriously with the problems of infant mortality. The first of the five in question was an International Congress on the Functions of Infants' Milk Depots, which was held in Paris in October, 1905. The mayor of Huddersfield, the chairman of the Health Committee of Glasgow, and various other representatives from Great Britain attended the congress, and as the immediate result of their attendance a National Conference on Infantile Mortality was held at Westminster, on June 13-14, 1906. A complete steno-

graphic report of the proceedings of that conference has been published (London, 1906), and the demand for copies from all parts of the world was so unexpectedly large that the first edition of 3,000 copies was speedily exhausted, and a second edition made necessary.

In the preface to the second edition the Executive Committee thus summarizes the former apathy and the present general interest in infant mortality above alluded to: "The Conference of 1906 was the first attempt to bring before the public one of the most important of the many aspects of the social problem of physical and social degeneration. Prior to the Conference the problem of the appalling death-rate of infants under one year attracted only the attention of medical men—and merely a small proportion of that profession—and of a few philanthropists and social reformers, and the Executive Committee, who organized the Conference of 1906, hardly ventured to hope that their efforts would result in one of the most successful conferences, from a public health and social reform point of view, which has been held in this country." The conference was held in the rooms of the Westminster City Council, under the patronage of their Majesties King Edward VII. and Queen Alexandra. The Right Hon. John Burns, M.P., president of the Local Government Board, presided; and the chairman and vice-chairman, respectively, were Alderman Evan Spicer, M.P., chairman of the London County Council, and the Hon. Lord Provost of Glasgow, William Bilsland, Esq. The Lord Mayors of Liverpool, Manchester, Leeds, York, and Belfast, the Lord Provosts of Glasgow, Edinburgh, and Aberdeen, various other governmental officials, and some of the foremost medical officials of Great Britain served as vice-presidents of the conference, and the enlistment of these notables gave a decided impetus to the new movement. A second National Conference on Infantile Mortality, with an even more distinguished list of vice-presidents and delegates, was held at Westminster, March 23, 24, 25, 1908, and, largely as a result of the previous conference, the Notification of Births Act of 1907 was adopted by Parliament. A complete report of the proceedings and

papers of the second conference was also published (London, 1908).

Practically simultaneous with the first National Conference at Westminster, an exposition was held at Berlin for the purpose of inaugurating a comprehensive study of all the various phases of the infant mortality problem, and some idea of the scope of its work may be gained from the mere announcement that the exposition was continued for nearly three weeks. In its issue of Oct. 13, 1906, *Charities and the Commons* presents a summary of the work of the exposition, in part as follows: "Accompanying the exhibits were exhaustive explanatory leaflets and monographs by the most celebrated specialists, and a catalogue containing every possible and minute detail to instruct and enlighten. A bare outline even of the rich mass of material presented would go far beyond the limits of our space, and give subjects for numbers of articles. The striking feature of the exhibit is the increasing solicitude of governments to concern themselves in questions affecting the well-being and happiness of people, and the rapidly increasing co-ordination between private, or voluntary, and civic and national, or authoritative, reforms. The conditions of infant mortality in the German Empire have for a long time and with reason been the cause of grave anxiety to German social and political scientists, since statistics have been showing that, of the 2,000,000 infants born annually, 400,000, or one-fifth, do not survive the first year of existence. This disquieting fact has given rise to the founding of an institute, where, as a central point for the whole empire, the subject of infant mortality, its direct and accessory causes, will be studied with a seriousness worthy of the subject, and with all the co-ordinated thoroughness and science known to the German municipality and the German medical profession. From the side of medicine is to be given the fullest inquiry into physiological, and from the municipality into social, contributing causes."

In September, 1907, an international conference on the subject was held at Brussels, under the name of the Second International Congress of Gouttes de Lait, and it was decided that

its scope should be extended, and that the next congress should be termed the International Congress for the Protection of Infant Life. Were any further evidence of the increasing interest in the subject necessary, it possibly might be supplied by citing the fact that the subject selected by the Council of the Royal Statistical Society for essays in competition for the Howard Medal in 1908-09 is: "A Statistical Study of Infantile Mortality in Great Britain and Ireland, and of its Causes."

Even this brief summation of recent movements—movements international, governmental, and statistical—in the direction of trying to discover some means of coping with the substantially stable death-rate among young children the world around, makes it evident, it seems to the writer, that the subject of infant mortality has at last begun to impress its importance upon the thinking element of the civilized world, and will unquestionably receive more and more attention in the next few years. In view of that fact a review of the subject from an up-to-date statistical stand-point may not be inopportune. As above noted, the compilation of vital statistics in Geneva dates back to 1549, and it might almost be said that from that time down to date there have been more or less complete compilations of the statistics of infant mortality. In England local statistics on those lines are practically co-existent with the Registrar-General's office, the Massachusetts statistics of infant mortality for an even half-century are presented in a table accompanying this paper, and about eighteen years ago Dr. Jacques Bertillon prepared for the *Encyclopédie d'Hygiène et de Médecine Publique* a compilation of infant mortality statistics for the various countries of Europe, dating back as far as 1862 in one case.

The annual reports of the Registrar-General's office contain abstracts of the infant mortality rates of all the leading countries of the world, substantially down to date, and Dr. George Newman's recent work on "Infant Mortality—A Social Problem," contains a mass of statistical information reprinted from various sources. The Tenth, Eleventh, and Twelfth Census

Reports, and the three subsequent Special Reports of the Census Office inaugurating the prospective annual reports of mortality statistics of this country, present a great array of information—such as it is—regarding deaths of children under the ages of 1 and 5 in the United States, and the reports of all the countries and States having bureaus of vital statistics also contain more or less data along these lines. Consequently, there has been no lack of infant mortality statistics for the last fifty years and more, but, so far as the writer is aware, there has been no previous accumulation of this widely scattered information in such a way as to permit of any reasonably accurate, up-to-date, international comparisons of the mortality among infants. As subsequently noted, the statistics of the United States at large are woefully defective, and in the case of nearly all the registration States the margin of error is unquestionably a wide one, but by means of various methods of comparison an effort has been made to reduce the statistics of this country to a fairly accurate basis, and it is hoped that a workable plan of contrasting the infant mortality rates of the United States and other countries has been found. Unless otherwise specified, the term “infant mortality rate,” wherever used in this paper, is to be construed as invariably referring to the rate of deaths under 1 year per 1,000 births—still-births excluded.

The table of Dr. Bertillon, above mentioned, is generally recognized as the earliest fairly accurate summary of the infant death-rate in Europe, and perhaps may best serve as the starting-point of this statistical review of the subject. Under the heading of “Tableau LXXXIII, Mortalité de 0 à 5 ans dans les principaux pays de l’Europe,” it appears in Bertillon’s chapter on “Démographie” in the *Encyclopédie d’Hygiène* (vol. i, p. 254), and, rearranged so as to present the various European countries in the order of their several death-rates under age 1, is as herewith reproduced. In its original form the table presents the supposed figures of the late ’70’s for Massachusetts, Rhode Island, and Vermont, which are omitted in the appended transposed reprint.

TABLE I.

MORTALITY FROM 0 TO 1 AND 0 TO 5 YEARS IN THE PRINCIPAL COUNTRIES OF EUROPE PRIOR TO 1883, ACCORDING TO THE BERTILLON TABLE.

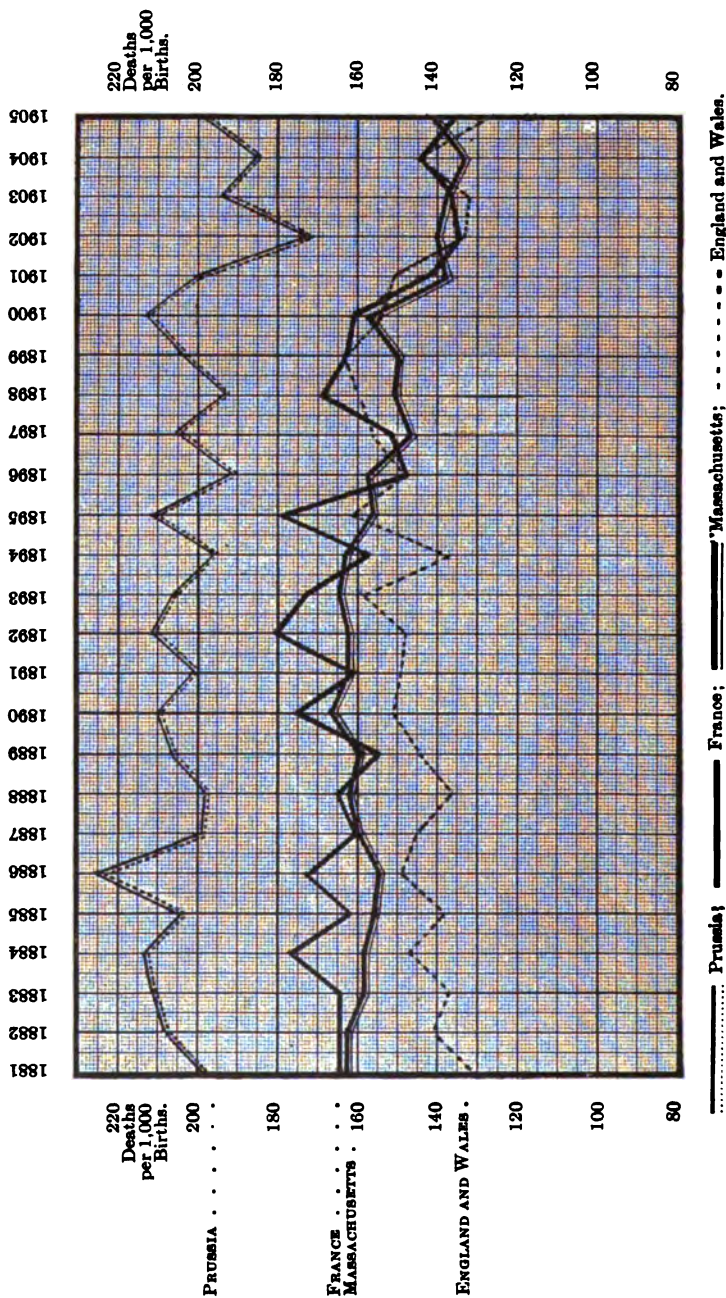
Countries.	Period of Observation.	Of 1,000 Born Alive, Died under 1 Year.	Of 1,000 Born Alive, Died under 5 Years.
Ireland	1865-83	95.9	164.6
Norway	1866-82	104.9	179.1
Scotland	1865-81	122.0	230.9
Sweden	1866-82	131.9	222.5
Denmark	1870-82	137.5	204.9
Greece	1878-82	137.7	264.5
Belgium	1867-83	148.2	253.2
England and Wales	1866-82	149.2	249.3
Portugal	1862	150.0	—
Finland	1878-80	164.9	—
France	1875-82	166.2	251.1
The Netherlands	1878-81	193.2	—
Switzerland	1869-80	195.2	266.3
Prussia	1874-82	207.8	316.2
Italy	1872-83	209.7	378.5
Alsace-Lorraine	1872-81	212.7	298.0
Croatia	1874-82	234.0	423.8
Roumania	1875-82	250.0	339.6
Austria	1866-83	255.3	389.9
Baden	1866-83	261.7	346.9
Russia in Europe	1867-78	266.8	422.9
Saxony	1865-70	270.0	373.5
Bavaria	1866-83	308.4	398.2
Württemberg	1871-81	312.5	397.1

The totals are not given with the tabulation as presented by Bertillon, but, dividing the total of 4,685.7 deaths under age 1 for 24 countries and the total of 6,366.0 deaths under age 5 for 21 countries, it appears that the averages for the European countries in the period stated were 195.2 for deaths under age 1 and 303.1 for deaths under age 5. In a general way, such were the infant death-rates of Europe a generation ago, *if* the returns on which Bertillon's table was based were correct. The question which naturally follows a study of them is: How have the infant death-rates of the intervening years compared with those of from thirty to forty years ago, in view of all the humanitarian, hygienic, and medical developments of this latter period? In the main, the conditions favorable to

better health, and a reduced death-rate, have materially improved. Has there been a corresponding improvement in the general health of infants, and a corresponding decrease in the death-rate of the little ones? Only the official vital statistics of the various countries can answer those questions, and, as the following tables will demonstrate, the answer is a sadly disappointing one.

The first attempt of any importance to assemble information on these lines, subsequent to the preparation in 1890 of the Bertillon table above reproduced, was made by Dr. Julius Eröss, and its results embodied in a paper presented before the Section for Children-Hygiene of the International Congresses for Hygiene and Demography at Budapest in 1894, under the title of "Ueber die Sterblichkeitsverhältnisse der Neugeborenen und Säuglinge." The text and tables of Dr. Eröss's paper were subsequently published in the *Zeitschrift für Hygiene und Infektionskrankheiten*, the important work periodically published at Leipzig under the editorial direction of Dr. Robert Koch and Dr. C. Flügge, and the statistics therein presented form a connecting link, as it were, between those of the Bertillon table and the infant mortality figures up to 1905 especially compiled by the writer for this paper, and presented in subsequent tables. The statistical data of Dr. Eröss's paper as published in the *Zeitschrift* (vol. xix, pp. 371-392) begin with Table I (p. 372), showing the "Infant Mortality of 0-1 Year at Rate of the Living Born and the Total Mortality in Thirteen European States," which, we are informed, was compiled from the various statistical year books. Translating its percentage ratios into rates per 1,000, for the sake of conformity with all the other tabulations of this paper, and taking the liberty of substituting in the list of countries for the name of Sweden that of Norway, which investigation of the official figures for both countries proves to have been the country with which the figures given for Sweden were identified, the table is as follows:—

DIAGRAM I.—A GRAPHIC COMPARISON OF THE ANNUAL FLUCTUATIONS IN THE INFANT MORTALITY RATES OF ENGLAND AND WALES, PRUSSIA, FRANCE, AND THE STATE OF MASSACHUSETTS, FOR THE TWENTY-FIVE YEARS, 1881-1905, INCLUSIVE, ON THE BASIS OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS, STILL-BIRTHS EXCLUDED.



For many years the annual reports of the Registrar-General have presented the most compact abstracts anywhere obtainable of the birth-rates, marriage-rates, death-rates, and death-rates under 1 year to each 1,000 children born, in practically all the European countries—and certain countries in other sections of the world. Taking those tables in the current (sixty-ninth) annual report as a basis, the writer has prepared the following tabulation, which affords a comprehensive picture of the infant mortality experience of the principal countries of Europe and Australasia for the last quarter of a century. The Registrar-General's report announces that in each case the figures were obtained from the statistical department of the country named, and that still-births have been eliminated in the case of both births and deaths, and in the preparation of the following tabulation the birth-rates and infantile death-rates for each five-year period named have been obtained by adding the rates for the 5 years and dividing the totals by 5. The general averages for the entire period under observation have been deduced by adding all the annual rates given in each case, and dividing the total by the number of years which each total represents. Had the actual *numbers* of births and deaths for each year for each country been available—as was the case with the restricted table of Dr. Eröss—instead of the birth-rates and death-rates, the five-year and total averages of course would have been slightly more exact, but the death figures are not given in the Registrar-General's returns from other countries, and, doubtless, the margin of error is so narrow as to be practically inappreciable. So explained, the tabulation in question speaks for itself, and is as follows:—

TABLE III.

BIRTH-RATES, AND DEATH-RATES UNDER AGE 1 PER 1,000 BIRTHS, OF THE PRINCIPAL FOREIGN COUNTRIES FOR THE LAST TWENTY-FIVE YEARS, BY FIVE-YEAR PERIODS AND FOR THE ENTIRE TWENTY-FIVE YEAR PERIOD—STILL-BIRTHS EXCLUDED IN BOTH CASES.

Countries.	1881-85.		1886-90.		1891-95.		1896-1900.		1901-05.		Averages, 1881-1905.	
	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.	Births per 1,000 of Population.	Deaths under 1 per 1,000 Births.
Norway	31.2	99	30.8	96	30.2	98	30.2	96	28.6	81	30.2	94
Ireland	23.9	94	22.8	95	23.0	102	23.3	106	23.2	98	23.2	99
Sweden	29.4	116	28.8	105	27.5	103	26.9	101	26.1	92*	27.7	104*
Bulgaria	37.0	81	36.1	95	37.7	140	41.3	143	40.9	145*	38.6	120*
Scotland	33.3	117	31.4	121	30.5	126	30.0	129	28.9	120	30.8	123
Denmark	32.4	134	31.5	137	30.4	139	30.0	132	29.0	119	30.7	132
Finland	35.5	162	34.5	144	31.8	145	32.6	139	31.4	131	33.2	144
England and Wales,	33.5	139	31.4	145	30.5	151	29.3	156	28.1	138	30.6	146
Switzerland	28.6	171	27.5	159	27.7	155	28.5	143	28.1	134	28.1	153
Belgium	31.1	156	29.5	163	29.2	164	28.9	158	27.7	148	29.3	158
Servia	46.3	157	43.7	158	43.3	172	40.0	159	38.8	149	42.4	159
France	24.7	167	23.1	166	22.3	171	22.0	159	21.3	139	22.7	160
The Netherlands	34.8	181	33.6	175	32.8	165	32.1	151	31.6	136	33.0	162
Italy	38.0	176	37.5	175	36.1	185	34.0	168	32.6	168	35.6	175*
Spain	36.4	193	36.0	186*	35.3	186	34.3	185	35.3	173	35.5	185*
Prussia	37.4	207	37.3	208	37.0	205	36.5	201	34.9	190	36.6	202
Roumania	41.8	182	40.9	195	41.0	220	40.2	216*	39.4	203	40.7	203*
Austria	38.2	223	37.8	223	37.5	223	37.3	226	35.6	213*	37.3	223*
Hungary	44.4	226	43.5	226	41.7	250	39.4	219	37.2	212	41.2	226*
Russia in Europe	49.1	271	48.2	264	48.2	276	49.3	261	48.6	268	48.6*	268*
Averages for Europe,	35.3	163	34.3	162	33.7	169	33.3	162	32.4	158	33.8	162
New Zealand	36.3	90	31.2	84	27.7	87	25.7	80	26.6	75	29.5	83
Tasmania	34.5	109	34.6	103	32.7	94	28.2	98	29.0	90	31.9	99
South Australia	38.5	101	34.7	105	32.0	99	27.0	112	24.5	87	31.3	101*
Queensland	36.5	136	37.4	119	34.1	103	29.2	104	26.7	95	32.8	111
New South Wales	37.7	124	36.4	115	32.9	111	28.0	113	26.7	97	32.3	112
Victoria	30.8	122	32.7	131	31.0	111	26.2	111	24.9	96	29.1	114
Western Australia	34.5	156	37.0	123	31.4	130	27.9	160	30.3	126	32.2	135*
Averages for Australasia	35.5	117	34.9	111	31.7	105	27.5	111	27.0	95	31.3	108
Japan	26.0	104	28.5	116	28.6	147	31.1	153	31.8	154	29.2	135
Ceylon	28.6	158	30.2	158	31.7	169	37.1	168	38.6	171	33.2	165
Jamaica	37.6	158	36.7	170	38.4	171	38.9	175	39.0	174	38.1	169
Chili	39.4	314	35.2	264	37.2	336	34.1	333	35.2	332*	36.2	314*
Averages for Countries Named	32.9	184	32.7	177	34.0	206	35.3	207	36.2	208	34.2	196

RECAPITULATION.

Europe	35.3	163	34.3	162	33.7	169	33.3	162	32.4	153	33.8	162
Australasia	35.5	117	34.9	111	31.7	105	27.5	111	27.0	95	31.3	108
Other Lands	32.9	184	32.7	177	34.0	206	35.3	207	36.2	208	34.2	196
†Grand Averages	35.1	155	34.2	152	33.3	159	32.2	157	31.6	147	33.3	154

* Returns for one or more years wanting, and averages have been calculated on basis of returns for other years of period in question.

† Computed by division of totals for all countries represented in table by number of countries in question.

Italicised figures represent estimates for periods for which no returns were available, estimate in each case being average of actual returns for balance of entire twenty-five year period.

So far as the writer is aware, the preceding table is the first detailed comparison ever compiled of the birth-rates and infantile death-rates of the leading countries of the world by five-year periods for an entire quarter of a century, and the continuity of comparisons sheds considerable light on many mooted questions which have been raised in the protracted discussion of infant mortality. Unfortunately, in a few cases returns were wanting, and in order to round out the averages for the periods and countries in question it was necessary to substitute estimates for actual returns. As stated in the appended foot-note, however, all estimates for five-year periods were based on the averages of returns for the balance of the twenty-five year period, and the margin of error, therefore, is probably so slight as to make no material difference in the general showing.

The first and all-important point to be noted in the tabulation is the uniformity of the infantile death-rate for the world at large for the last quarter of a century, and its comparatively slight fluctuations by five-year periods in particular countries or sections of the world. Thus it will be noted, in the thirty-one widely remote countries for which returns are presented, in 1881-85 the rate of infant deaths per 1,000 births was 155, and in the period commencing twenty years later was practically identical, then standing at 154. As is shown by a subsequent table herein presented, the apparent infantile death-rate in this country in the States recognized as registration States at the time of the Twelfth Census was 144.7 in 1900 and 162.6 in 1890, thus averaging 153.7; and, as is demonstrated by another table showing the annual infant mortality rates in Massachusetts from 1856 to 1905, the average infant death-rate under age 1 per 1,000 living births in that Commonwealth for the last fifty years has been 152.4. Succinctly stated, the infantile death-rates for these various sections and periods were as follows:—

TABLE IV.

THE UNIFORMITY OF THE INFANTILE DEATH-RATE IN ALL SECTIONS OF THE WORLD IN RECENT YEARS.

Sections.	Periods of Observation.	Deaths under Age 1 per 1,000 Births.
31 Countries of Europe, Australasia, and other lands	1881-1905	154
Registration States of the United States in 1900 .	* 1890 and 1900	153.7
State of Massachusetts	1856-1905	152.4

* Census years ending May 31.

In view of the many material changes in the living habits and industrial conditions of the world's population in the last generation, the great advance in medical knowledge, and the marked decrease in the general death-rate, the practical uniformity of the infantile death-rate the world around is simply astounding. On the face of the above showing it apparently has a regularity in keeping with that of the American Experience Table of mortality; and, bearing in mind the point noted in H. Llewellyn Heath's book,—namely, that in the sixteenth century the infant deaths constituted 25.9 per cent. of all the deaths at Geneva and in 1904 were 25 per cent. of all the deaths in England and Wales,—there is an almost weird suggestion of the pitiless inflexibility of Fate in the death-rate of infants. Of course there are wide variations in the infant death-rates of individual communities, but, as the tables herewith presented will show, the fluctuations in long-established and stable communities would seem to be comparatively slight, and, as has apparently been demonstrated by the preceding tables, when a really broad average has been attained the change in the infantile death-rate of the world at large in a long stretch of years apparently is almost infinitesimal.

In most, if not all, countries—and certainly in nearly all the States of the United States—there are more or less serious defects in the registration of vital statistics, especially in the recording of births. That subject has been so thoroughly

threshed out as to call for no comment here. But, to a certain extent, the defects of one country's registration system would be offset by the comparative perfection of that in force in some other country, in a tabulation of world-wide scope, and in the case of the twoscore countries and States dealt with in the last table it is not improbable that the percentage of error is substantially uniform. Even were the inquiry restricted to the two English-speaking sections whose registration systems are generally regarded as freest from defects—to wit, England and Wales on one side of the Atlantic and the State of Massachusetts on this side of the water—the variations in their infant mortality rates in the last twenty-five years and the averages for the entire period differ but slightly, the infant death-rates in England and Wales for the five latest five-year periods having been in the order of 139, 145, 151, 156, and 138, and those of Massachusetts for the same periods having been 160, 161, 161, 153, and 138. The widest range of five-year variation in the case of England and Wales was 18 per 1,000 births, and that in the case of Massachusetts 22 per 1,000 births. Their respective averages for the twenty-five year period were 146 and 154.

In the tabulation of infant mortality in the principal countries of Europe compiled and published in 1890 by Dr. Bertillon and reproduced in transposed form on a previous page of this paper, the latest date of observation was the year 1883,—that is to say, twenty-five years ago,—and some of the figures dated back to 1862. In those days the registration of vital statistics in many—if not most—of the countries of Europe was far less advanced than it has become of late years, and, taking into account the well-known fact that approximate completeness in the registration of deaths almost inevitably precedes that of registration of births, it might naturally be assumed that the apparent rates of infant deaths to births would have been much larger in the case of the records of 1862–1883 than in those of 1881–1905, the divisor in the previous calculation presumably having been much farther removed from the correct figure. As to how well founded that

assumption proves, the following comparison of the death-rates in the Bertillon table and that compiled by the writer of this paper will indicate.

Some considerable *apparent* decreases in the infant mortality rates of certain countries are to be noted in the following table,

TABLE V.

A COMPARISON OF THE INFANT MORTALITY IN THE PRINCIPAL COUNTRIES OF EUROPE IN THE LAST TWENTY-FIVE YEARS WITH THE EARLIER PERIODS NAMED IN BERTILLON'S TABLE AND THE DECREASE OR INCREASE AND RELATIVE RANK IN THE CASE OF EACH OF THE COUNTRIES.

	Infant Mortality in Periods Named.		Deaths per 1,000 Births, 1881- 1905.	Decrease or Increase.	Rank in Order of Lowest Infant Mortality.	
	Period of Observation.	Deaths per 1,000 Births.			Early Period.	Later Period.
Ireland	1865-83	95.9	99	3.1*	1	2
Norway	1866-82	104.9	94	10.9	2	1
Scotland	1865-81	122.0	123	1.0*	3	4
Sweden	1866-82	131.9	104	27.9	4	3
Denmark	1870-82	137.5	132	5.5	5	5
Belgium	1867-83	148.2	158	9.8*	6	9
England and Wales . .	1866-82	149.2	146	3.2	7	7
Finland	1878-80	164.9	144	20.9	8	6
France	1875-82	166.2	160	6.2	9	10
The Netherlands . .	1878-81	193.2	162	31.2	10	11
Switzerland	1869-80	195.2	153	42.2	11	8
Prussia	1874-82	207.8	202	5.8	12	13
Italy	1872-83	209.7	175	34.7	13	12
Roumania	1875-82	250.0	203	47.0	14	14
Austria	1866-83	255.3	223	32.3	15	15
Russia in Europe . .	1867-78	266.8	268	1.2*	16	16
Averages		174.9	159.1	15.8		

* Increase.

and on the face of the returns it would seem that those countries were to be congratulated on having somehow succeeded in devising ways and means of reducing this phase of the mortality problem in which the vast majority of countries have notably failed, whether through lack of serious attention to the subject or for other reasons. But is such the case? Let

us go behind the returns, locate the countries which have scored the largest apparent decreases, and consider for a moment whether those countries might naturally be expected to be found in the forefront of the movement for the reduction of infant mortality.

Of the sixteen countries named in the table, eight show an apparent annual decrease of more than 10 deaths per 1,000 births since the early 80's, the decrease ranging from 10.9 in the case of Norway up to the remarkable figure of 47 in the case of Roumania, and the other countries in the order of the largest seeming decrease being Switzerland, Italy, Austria, the Netherlands, Sweden, and Finland. And yet none of these countries has ever attained any particular prominence in the crusade for the protection of children's lives. Austria is the only one of the eight which could be even seriously considered as among the great European powers, and, as will be noted, none of the indisputably first-class powers appears in the list. In England, France, and Prussia the decrease in the death-rate was merely nominal, and, as the registration systems of those countries would probably be regarded as superior to that in any of the eight countries which have scored the apparent large decreases in the infant death-rate, it would seem not only possible, but extremely probable, that the decrease in the last-named countries was more apparent than real—in other words, was a decrease in figures only, very likely due to the material increase in the registration of births and the consequent decrease in the ratio of deaths under age 1 to births. In England, France, and Prussia the registration of births was probably much more complete thirty or forty years ago than in most of the smaller countries of Europe, and, if such was the case, there naturally would be much less fluctuation in the mortality rates in the case of those leading countries. Therein probably lies the explanation of most of the apparent large decreases in the last twenty-five years.

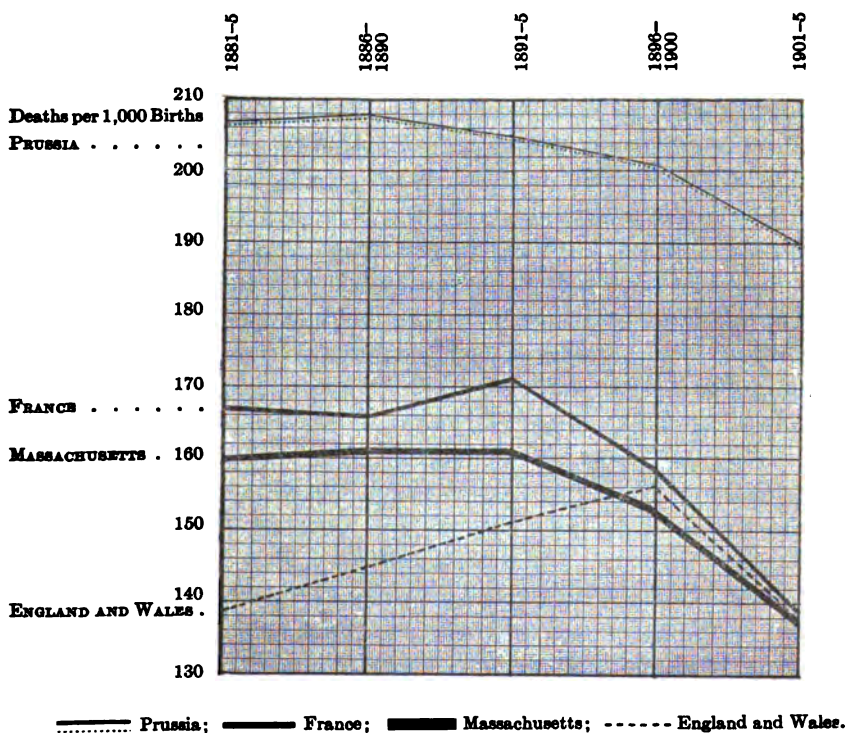
In default of positive evidence it would be absurd to believe that the little country of Roumania, with its limited resources, had succeeded in effecting a reduction of its infant death-rate

by nearly 20 per cent. in the last twenty-five years, and thereby materially distanced every other country in the world. Furthermore, as shown in Table III, the record of its infant death-rates by five-year periods proves that the rate has been almost continuously in the ascendant for that same period. The British Registrar-General's office was unable to obtain any infantile death-rates from Austria up to 1896, or from Italy up to 1891, and in those obtained since those dates there is no sign of any sharp decline. Norway, Sweden, Finland, the Netherlands, and Switzerland have apparently shown material decreases in the infant death-rate in most of the five-year periods of the last quarter of a century, but improved registration of births probably accounts for that fact in most, if not all, of those cases, and it would therefore seem that the pronounced differences in some cases between the death-rates of the old-time Bertillon table and the up-to-date table presented in connection with this study are unworthy of any serious attention. In the face of the surprising uniformity of the mortality rate in question in the world at large, and especially in countries having thoroughly established registration systems, only the most irrefutable evidence will convince any student of infant mortality of a *permanent* reduction in the infant death-rate in any country up to this time.

In so far as the infantile death-rate in the United States as a whole—either now or at any previous time—is concerned, there are absolutely no authentic data. In his contribution to the Eleventh Census Report on Vital and Social Statistics, published in 1896, Dr. Billings accounted for that fact by authoritatively stating (Part I, p. 21) that “we have no fully complete and accurate registration of births in any part of the United States. The most accurate registration is probably in Massachusetts, in which it is estimated that the deficiency is not greater than 2 per cent.” Again, in Volume III of the Twelfth Census Reports (Vital Statistics, Part I, p. xlix) the late William A. King, Chief Statistician for Vital Statistics, commenced his discussion of births with the admission that “the data relating to births are the most incomplete and unsatis-

factory of any treated in this report. Were it not considered desirable to give such results as bear upon the question for the information of students of the statistics, the subject might be dismissed with the statement that they are entirely inadequate to determine, directly, the general birth-rate of the country, or, what is of equal practical importance, the relative birth-rate of different classes of population. A number of the States and cities have laws requiring the registration of births, but it is doubtful if there is a single place in which births are registered as fully as deaths."

DIAGRAM II.—THE INFANT MORTALITY RATES OF ENGLAND AND WALES, PRUSSIA, FRANCE, AND THE STATE OF MASSACHUSETTS BY FIVE-YEAR PERIODS FROM 1881 TO 1905, ON THE BASIS OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS, STILL-BIRTHS EXCLUDED.



As the census authorities have repeatedly stated, the data regarding the number of living children under 1 year of age are also utterly incomplete and inaccurate, owing to the fact that the number so returned is too small in practically all localities, partly owing to the practically universal tendency to report children in the later months of the first year as 1 year old. For these reasons it would be utterly futile to attempt the compilation of any figures of the infant mortality rate in the United States at large for purposes of comparison with the returns for other countries presented in the preceding tables. In the Registrar-General's annual reports for some years past, returns of this character from thirty-two countries have been presented, but the United States has been the one great country in the world for which no figures were given.

In the light of these conditions it might at first seem practically impossible to obtain even an approximate idea of the status of infant mortality in this country, but such is not the case, the number of registration States and the magnitude of their combined population being sufficient to afford a fairly accurate index of the conditions in Continental United States as a whole. The registration systems of these States greatly differ in point of comprehensiveness and reliability, but by common consent that of Massachusetts is regarded as of foremost importance, and the complete record of infant deaths in that State for the last half-century undoubtedly affords by far the best available standard of measurement and comparison in a study of infant mortality in this country. In the Twenty-eighth Annual Report of the State Board of Health of Massachusetts, published in 1897, there appeared a comprehensive study of "The Vital Statistics of Massachusetts—A Forty Years' Summary," which was prepared by Dr. Samuel W. Abbott, secretary of the Board of Health. This chapter of more than 100 pages (pp. 711-829) begins with a graphic tracing of the "Marriage, Birth, and Death Rates and Infantile Death-rate, Massachusetts, 40 Years, 1856-95," and contains a complete tabulation of "Infant Mortality, Massachusetts, 1856-95, Forty Years," presenting the annual figures for each of those years.

For some reason not explained in the text, the birth statistics in that tabulation begin with July 1, 1856, and end with June 30, 1895, whereas the deaths under 1 year in the same table are taken from the calendar-year records, thus making the birth and death rate figures materially differ from those in the twenty-year infant mortality record presented in recent Massachusetts registration reports of births, marriages, and deaths. It has seemed desirable to eliminate this discrepancy, and the following tabulation of infant mortality in Massachusetts for the fifty years ending Dec. 31, 1905, has therefore been compiled in part from Dr. Abbott's table of infant mortality (p. 750), in so far as deaths under 1 from 1856 to 1895, inclusive, are concerned, and partly from his tabulation of marriages, births, and deaths from 1842 to 1895 (pp. 721-722), the supplemental figures for births and infant deaths in the calendar years 1896 to 1905, inclusive, being taken from the twenty-year table of infant mortality in the current (sixty-fifth) Massachusetts Report of Births, Marriages, and Deaths (p. 205). The composite tabulation of infant mortality herewith presented is thus made complete for the fifty calendar years ending with 1905, and, in order to permit of comparison with the statistics of foreign countries presented in the previous tables accompanying this article, is supplemented with a column containing the annual birth-rates in Massachusetts for the last fifty calendar years, as presented in the Sixty-fifth Massachusetts Report of Births, Marriages, and Deaths (pp. 141-142). Still-births have been excluded in all cases.

TABLE VI.

A COMPLETE RECORD OF BIRTHS, DEATHS UNDER AGE 1, THE INFANTILE DEATH-RATE PER 1,000 BIRTHS, AND THE BIRTH-RATE IN MASSACHUSETTS FOR EACH OF THE FIFTY YEARS 1856-1905, INCLUSIVE, EXCLUDING STILL-BIRTHS.

Calendar Year.	Births.	Deaths under 1 Year.		Birth-rate per 1,000 Population.
		Number.	Rate per 1,000 Births.	
1856	34,445	4,226	122.7	29.91
1857	35,320	4,160	117.8	30.17
1858	34,491	4,197	121.7	28.97
1859	35,422	4,175	117.9	29.28
1860	36,051	4,821	133.7	29.28
1861	35,445	5,167	145.8	28.63
1862	32,275	4,216	130.6	25.92
1863	30,314	4,545	149.9	24.20
1864	30,449	4,693	154.1	24.17
1865	30,249	4,869	161.0	23.87
1866	34,085	4,699	137.9	26.16
1867	35,062	4,763	135.8	26.17
1868	36,193	5,421	149.8	26.26
1869	36,141	5,368	148.5	25.50
1870	38,259	6,206	162.2	26.25
1871	39,791	5,996	150.7	26.63
1872	43,235	8,390	194.1	28.21
1873	44,481	7,911	177.8	28.31
1874	45,631	7,489	164.1	28.32
1875	43,996	7,712	175.3	26.63
1876	42,149	6,700	159.0	25.12
1877	41,850	6,343	151.5	24.57
1878	41,238	6,189	150.1	23.85
1879	40,295	5,855	145.3	22.95
1880	44,217	7,190	162.6	24.80
1881	45,220	7,389	163.4	24.93
1882	45,670	7,445	163.0	24.75
1883	47,285	7,515	158.9	25.14
1884	48,615	7,735	159.1	25.46
1885	48,790	7,625	156.3	25.12
1886	50,788	7,848	154.5	25.42
1887	53,174	8,514	160.1	25.86
1888	54,893	8,870	161.6	25.95
1889	57,075	9,105	159.5	26.23
1890	57,777	9,625	166.6	25.81
1891	63,004	10,186	161.7	27.53
1892	65,824	10,649	161.7	28.13
1893	67,192	10,990	163.6	28.09
1894	66,936	10,899	162.8	27.37
1895	67,545	10,564	156.4	27.02
1896	72,343	11,765	157.8	28.27
1897	73,205	10,751	146.9	27.96
1898	73,110	11,012	150.6	27.29
1899	70,457	10,532	149.5	25.70
1900	73,386	11,500	156.7	26.16
1901	71,976	9,952	138.3	25.07
1902	72,219	10,075	139.5	24.58
1903	73,584	10,269	138.3	24.48
1904	75,014	9,992	133.2	24.39
1905	75,022	10,519	140.2	24.98
Totals	2,511,188	382,627	152.4	26.32

Thanks to the early establishment of the registration system of Massachusetts, recognized the world over for many years as the most reliable index of American vital statistics, the preceding table unquestionably affords by far the most comprehensive and most authoritative tracing of infant mortality in at least one section of this country which is now obtainable from any or all sources. The pronounced annual fluctuations in both birth and death rates are somewhat misleading, however, and the appended tabulation of births and infant deaths by five-year periods not only puts the case much more comprehensively, but also reduces the Massachusetts tabulation to the basis followed in the preceding foreign tabulations, and thus makes possible a comparison by five-year periods. Thus arranged, the statement of births and infant deaths in Massachusetts for the last half-century is as follows:—

TABLE VII.

BIRTHS, BIRTH-RATES PER 1,000 POPULATION, AND DEATHS UNDER 1 YEAR AND THEIR RATE PER 1,000 BIRTHS IN MASSACHUSETTS BY FIVE-YEAR PERIODS FOR THE FIFTY YEARS 1856-1905, INCLUSIVE—STILL-BIRTHS EXCLUDED IN BOTH CASES.

Five-Year Periods.	Living Births.		Deaths under 1 Year.	
	Number.	Birth-rate per 1,000 Population.	Number.	Rate per 1,000 Births.
1856-60	175,729	29.52	21,579	122.8
1861-65	158,732	25.36	23,490	148.0
1866-70	179,740	26.07	26,457	147.2
1871-75	217,134	27.62	37,498	172.7
1876-80	209,749	24.26	32,277	153.9
1881-85	235,580	25.09	37,709	160.1
1886-90	273,707	25.85	43,962	160.6
1891-95	330,501	27.63	53,288	161.2
1896-1900	362,501	27.08	55,560	153.3
1901-05	367,815	24.70	50,807	138.1
Totals	2,511,188	26.32	382,627	152.4

RECAPITULATION BY TWENTY-FIVE YEAR PERIODS.

1856-1880	941,084	26.57	141,301	150.1
1881-1905	1,570,104	26.07	241,326	153.7

When the summary for the last twenty-five years, in the last line of this table, is compared with the corresponding figures for foreign countries presented in Table III of this paper, one is immediately impressed with the surprising uniformity of the infant mortality rate the world around, which has already been alluded to. In the thirty-one foreign countries, in widely remote parts of the world, dealt with in Table III, the general average of deaths under 1 year to each 1,000 births in the twenty-five years ending with 1905 was 154: in the same period the infant death-rate in Massachusetts was 153.7. In the twenty European countries whose returns are presented in Table III—Austria, Hungary, and Russia, with their abnormally high death-rates, included—the average infant death-rate for the last twenty-five year period was 162 as compared with the Massachusetts rate of 153.7, and for the five five-year periods involved the European infant death-rates were, in order, 163, 162, 169, 162, and 153, as compared with death-rates of 160.1, 160.6, 161.2, 153.3, and 138.1 in Massachusetts. In fact, the correspondence between the infant death-rates of Europe and its leading countries and those of Massachusetts is so strikingly close that it can only be appreciated by means of a tabular statement, such, for instance, as the following:—

TABLE VIII.

A COMPARISON OF THE INFANT MORTALITY RATES PER 1,000 BIRTHS OF THE WORLD AT LARGE AND LEADING EUROPEAN COUNTRIES WITH THOSE OF MASSACHUSETTS BY FIVE-YEAR PERIODS, 1881-1905, INCLUSIVE.

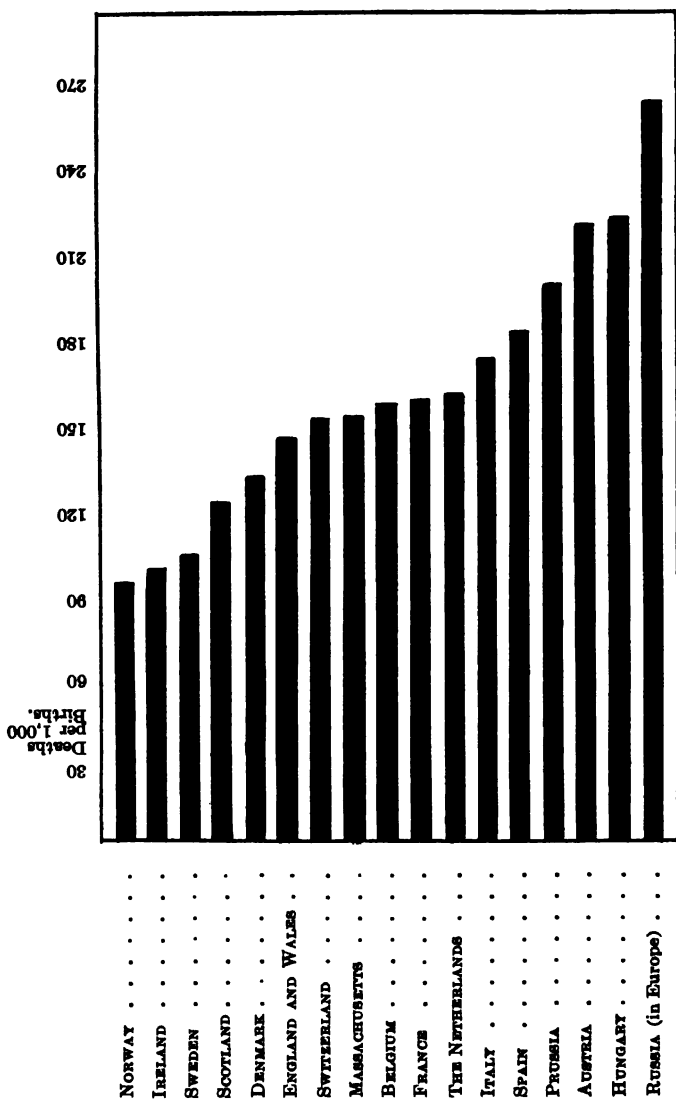
	1881 to 1885.	1886 to 1890.	1891 to 1895.	1896 to 1900.	1901 to 1905.	1881 to 1905.
31 foreign countries in all parts of the world . . .	155	152	159	157	147	154
20 European countries	163	162	169	162	153	162
England and Wales, France and Prussia	171	173	176	172	156	169
England and Wales, and France	153	156	161	158	139	153
MASSACHUSETTS	160	161	161	153	138	154

This table tells its own story, and would seem to prove beyond all peradventure that there is a general uniformity in the undulations of the infant mortality wave at various periods, in the world at large, however mysterious and inexplicable may be the undiscovered influences which regulate it. As will be observed, in all the different groups of countries above presented, there was a gradual rise in the death-rate up to 1891-95, and a gradual falling from 1895 to 1905, in each case the top notch being arrived at in 1891-5, and in every case except that of Massachusetts the death-rate for the entire twenty-five year period being practically identical with that of the first five-year period. The Massachusetts rate for the twenty-five years was lower by 6 deaths per 1,000 births than was the rate for the first five years, whereas in the case of all the other sections of the world named the largest decrease in the twenty-five year average as compared with the rate for the first five years was only 2 deaths per 1,000 births; and the comparison of the Massachusetts figures with those for England and Wales, France, and Prussia, is a particularly reliable one for the reason that the registration systems of those sections are presumably freer from error than any others which could be selected.

In short, this latest tabulation strongly confirms the broad average showings of Table III, and again suggests the question before raised—namely, why this surprising uniformity in the infant death-rate the world around? Furthermore, why the general rise in the death-rate from 1881 to 1895, and why the general fall in the death-rate from the last-named date down to 1905? No living man can rationally answer those grave questions. It would be pleasant to believe that, as the world advances in knowledge, in hygiene and sanitation, and in humanitarianism, infant mortality correspondingly decreases; but only a substantially continuous decline in the infant death-rate for a long term of years, in countries with thoroughly established registration systems, could substantiate any such optimistic theory.

As previously stated, the fifty-year record of Massachusetts affords the very best available standard of measurement and

DIAGRAM III.—THE AVERAGE INFANT MORTALITY RATES FOR THE TWENTY-FIVE YEARS, 1881-1905, OF SIXTEEN OF THE LEADING EUROPEAN COUNTRIES, AND THE STATE OF MASSACHUSETTS, ON THE BASIS OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS, STILL-BIRTHS EXCLUDED.



comparison for any study of infant mortality in this country, and *in comparison* with that standard the reports of recent decennial censuses of the United States, at best dealing with single twelvemonths ten years apart, are of but little value. In his interesting paper issued under the title of "A Discussion of the Vital Statistics of the Twelfth Census" by the Bureau of the Census in 1904 (Bulletin 15), Dr. Billings thus clearly explains this fact (pp. 7-8): "If the purpose in consulting these reports be to obtain comparative data showing the result of varying conditions upon the general mortality, or to show the relative death-rates at different ages, from different causes or of different classes of population in the same or different places during a series of consecutive years, the information must be sought from the local reports on this subject issued by the States or cities for which comparisons are wanted. Here the student or analyst finds great difficulty in securing any comprehensive information, owing to lack of tables covering the details sought. Very few of the cities make any extensive compilation of the material at their command, and in such compilations which are most complete, as well as in the State reports, there are differences in the forms of tables and in the methods of classifying the data which prevent carrying comparisons very far, even if they do not entirely preclude them. . . . No State has a complete registration of births, the ones that come nearest to it being probably Massachusetts, Rhode Island, and Connecticut, but the results of the registration in these States should be sought, not in the census report, but in the State reports of births, marriages, and deaths. The only States which had (at the time the Twelfth Census was taken) a registration of deaths sufficiently complete to make the death-rates worth calculating were Connecticut, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, and Rhode Island, which with the District of Columbia (and Vermont) form the group referred to in the census report as the 'registration' States."

Having secured by the courtesy of the registration officials of all the registration States copies of their recent reports, and

carefully studied them with a view to the compilation, if possible, of a general résumé of the infant death-rates in those States for a period of sufficient length to warrant at least certain general deductions, the writer is more than ready to agree with Dr. Billings that "in the State reports [of vital statistics] there are differences in the forms of tables and in the methods of classifying the data which prevent carrying comparisons very far, even if they do not entirely preclude them."

The Massachusetts report affords by far the best data for that purpose, containing a compact tabulation of infant mortality and the rate per 100 living births for each of the last twenty years. But no such thoroughly welcome data are to be found in any of the other registration States' current reports. The Connecticut report, which probably ranks second in general utility, has a ten-year table of mortality and death-rates by ages, but the death-rates for children under 1 year are the percentage ratios to total mortality. The New Jersey report's data and diagram dealing with infant mortality are made up on a basis of deaths under 5 years. The Rhode Island report states the annual infant death-rates to births for the last five years, but presents the rates for the previous fifty years in the abbreviated form of three ten-year and one twenty-year ratios. Most, if not all, of the other registration reports are even less serviceable in any extended compilation of infant mortality, in some cases still-births having been included in the figures up to very recent dates; and after a study of them all it became apparent that the United States census reports afford the only practicable means of securing within any reasonable time a comparative showing of the infant mortality in even the registration States for any considerable stretch of time, that is to say, with all the figures compiled and tabulated on a common basis. For reasons already stated an attempt to tabulate the returns from the country at large, including the non-registration States, would have been unworkable of serious consideration.

In the introductory remarks to his analysis of the vital sta-

tistics of the Twelfth Census, the late William A. King noted (vol. iii, p. xii) that "the census utilization of registration records as a source of information commenced with the Tenth Census (1880), when copies of the records of two States, Massachusetts and New Jersey, were secured and used as the basis of the statistics for those States. At the Eleventh Census (1890) the registration area was extended to include seven other States, namely: Connecticut, Rhode Island, New Hampshire, Vermont, New York, Delaware, and the District of Columbia, with the cities therein and 83 cities in other States." As stated in the introduction to the inaugural volume of the present annual mortality statistics, issued in 1906 by the Bureau of the Census (p. xiv), when the Twelfth Census was taken the registration area included all of the last-named States, and in addition the States of Maine and Michigan, and 153 cities of 8,000 or more population in other States.

The census utilization of registration records not having commenced until the taking of the Tenth Census, in 1880, any inquiry regarding infant mortality in this country as recorded in the census reports is obviously restricted to the Tenth Census for the earliest records of any value whatsoever, and the tables which have been prepared for this paper are therefore confined to the records of the Tenth, Eleventh, and Twelfth Censuses. Although Massachusetts and New Jersey were the only States whose registration records were used in the compilation of the Tenth Census, most, if not all, of the other registration States of 1900 had established bureaus of vital statistics as early as 1880. All of them except Maine and Michigan were included among the registration States when the Eleventh Census was taken, and, in order to make the comparison complete for the three latest censuses, the figures for both 1880 and 1890 of all the registration States of 1900 are included in the following tables. Prior to the Twelfth Census, still-births, which were then excluded, had been included in the United States census mortality figures, but in all of the tables here presented the still-births for all three census years have been eliminated.

In the second annual report of the Registrar-General's office, issued in 1840, in his discussion of the mortality of children, Dr. Farr laid down the rule (p. 16) that, "even though the registration of births is still deficient, yet, even with this admitted probable deficiency, the number of births, if applied as an element of calculation, will show a mortality much less than it appears in the Comparative Table of Deaths," and from that day to this that method of calculating the infant mortality rate has practically been regarded by all statistical authorities on the subject as freest from error, and hence the most reliable of all known methods of measuring the rate. By applying this standard of measurement the deaths under 1 year and rates per 1,000 births in 1880, 1890, and 1900 in the registration States of 1900, have been as shown in the appended table, according to the United States census reports for the years in question.

Many and serious as the defects in this table are—especially for the earliest year, 1880, when Massachusetts and New Jersey were the only registration States—it probably provides at

TABLE IX.

BIRTHS, DEATHS UNDER 1, AND DEATH-RATES PER 1,000 BIRTHS IN EACH OF THE REGISTRATION STATES OF 1900, ACCORDING TO THE TENTH, ELEVENTH, AND TWELFTH CENSUS REPORTS—STILL-BIRTHS EXCLUDED IN EACH CASE.

States.	Census Year 1900.			Census Year 1890.			Census Year 1880.		
	Births during Census Year.	Deaths under 1 Year of Age.	Deaths under 1 per 1,000 Births.	Births during Census Year.	Deaths under 1 Year of Age.	Deaths under 1 per 1,000 Births.	Births during Census Year.	Deaths under 1 Year of Age.	Deaths under 1 per 1,000 Births.
Registration States of 1900	418,321	60,524	144.7	329,823	53,645	162.6	297,490	36,036	121.1
Connecticut	21,757	3,101	142.5	15,864	2,344	147.8	13,825	1,387	100.3
District of Columbia	5,612	1,306	232.7	5,314	1,382	260.1	* 5,454	* 1,283	* 235.2
Maine	14,716	1,946	132.2	11,761	1,124	95.6	13,447	912	67.8
Massachusetts	67,228	10,754	160.0	48,156	8,792	182.6	41,338	5,891	142.5
Michigan	58,800	6,570	111.7	51,931	4,667	89.9	45,244	3,744	82.7
New Hampshire	8,872	1,384	156.0	6,918	1,063	153.7	6,557	589	89.8
New Jersey	48,158	7,292	151.4	36,351	6,939	190.9	31,069	4,206	138.3
New York	175,334	25,492	145.4	139,642	25,208	180.5	126,740	16,632	131.2
Rhode Island	10,472	1,854	177.0	7,732	1,490	192.7	6,803	711	107.7
Vermont	7,372	825	111.9	6,154	636	103.3	7,213	591	81.9

* Including still-births, no returns for still-births being given in reports of Tenth Census.

least an approximate idea of the relative death-rates among children under 1 year of age in the States in question in the census years 1880, 1890, and 1900. The District of Columbia has been included solely for the reason that it was part and parcel of the registration area in 1900, but its death-rate is not to be seriously considered, including as it does the heavy mortality among colored children, the colored infant death-rate being nearly twice as high as the white rate in each case. As the District of Columbia was the only portion of the registration area in 1900 having any considerable percentage of colored population, and as the comparatively unimportant colored mortality in the registration States is a negligible quantity so far as affecting the general mortality rates is concerned, it was not deemed advisable to attempt to separate the white and colored mortality in the preparation of the tables in this paper based upon the census reports. The District of Columbia figures are, therefore, of practically no importance in this analysis of the statistics of infant mortality, and may properly be disregarded in the study of any of the tables in which they appear. With them eliminated, it will be noted that in 1880 Massachusetts apparently led all the States named in its apparent infant death-rate of 142.5, but that Rhode Island took the lead in 1890 and retained it in 1900. According to the census reports, Massachusetts' infant death-rates in the census years 1880, 1890, and 1900, were respectively 142.5, 182.6, and 160.0 as compared with rates of 162.6, 166.6, and 156.7 for the calendar years in question, according to the registration records of the State as presented in Table VI.

The above table undoubtedly presents the most accurate showing of infant mortality in the districts dealt with which can be compiled from the census reports for the years in question, but, in order to perfect the statistical record of the subject, it may be worth while to find space for the infant death-rates in the several States named, as measured, (1) by the rate of deaths under 1 year per 1,000 of the supposed living population of that age, and (2) by the ratio of infant deaths to total deaths. The census figures in both cases are presented in Tables X and XI herewith appended:—

TABLE X.

THE INFANT MORTALITY RATE IN 1880, 1890, AND 1900 IN EACH OF THE REGISTRATION STATES OF 1900, AS MEASURED BY THE RATE OF DEATHS UNDER 1 YEAR PER 1,000 LIVING POPULATION OF THAT AGE, ACCORDING TO THE TENTH, ELEVENTH, AND TWELFTH CENSUS REPORT—STILL-BIRTHS EXCLUDED.

States.	Census Year 1900.			Census Year 1890.			Census Year 1880.		
	Popula- tion at End of Census Year.	Deaths.	Death- rate per 1,000 Living.	Popula- tion at End of Census Year.	Deaths.	Death- rate per 1,000 Living.	Popula- tion at End of Census Year.	Deaths.	Death- rate per 1,000 Living.
Registration States of 1900	379,951	60,524	159.3	298,154	53,645	179.9	273,559	36,036	131.7
Connecticut	19,774	3,101	156.8	14,469	2,344	162.0	12,879	1,387	107.7
District of Columbia	4,758	1,306	274.5	4,467	1,382	309.4	4,624	*1,283	*277.5
Maine	13,503	1,946	144.1	11,158	1,124	100.7	12,812	912	71.2
Massachusetts	60,492	10,754	177.8	43,043	8,792	204.3	37,587	5,891	156.7
Michigan	54,161	6,570	121.3	48,954	4,667	95.3	42,585	3,744	87.9
New Hampshire	8,048	1,384	172.0	6,347	1,063	167.5	6,141	589	95.9
New Jersey	43,571	7,292	167.3	32,087	6,939	216.2	28,192	4,296	152.4
New York	159,521	25,492	159.8	124,977	25,208	201.7	115,847	16,632	143.6
Rhode Island	9,368	1,854	197.9	6,890	1,490	216.3	6,132	711	115.9
Vermont	6,755	825	122.1	5,762	636	110.4	6,760	591	87.4

* Including still-births, no returns for still-births being given in reports of Tenth Census.

TABLE XI.

THE INFANT MORTALITY RATE IN 1880, 1890, AND 1900 IN EACH OF THE REGISTRATION STATES OF 1900, AS MEASURED BY THE RATE OF DEATHS UNDER 1 YEAR PER 1,000 DEATHS AT ALL AGES, ACCORDING TO THE TENTH, ELEVENTH, AND TWELFTH CENSUS REPORTS—STILL-BIRTHS EXCLUDED.

States.	Census Year 1900.			Census Year 1890.			Census Year 1880.		
	Total Deaths during Census Year.	Deaths under Age 1 during Census Year.		Total Deaths during Census Year.	Deaths under Age 1 during Census Year.		Total Deaths during Census Year.	Deaths under Age 1 during Census Year.	
		Deaths.	Rate per 1,000 at All Ages.		Deaths.	Rate per 1,000 at All Ages.		Deaths.	Rate per 1,000 at All Ages.
Registration States of 1900	301,670	60,524	200.6	262,149	53,645	204.6	191,230	36,036	188.4
Connecticut	15,422	3,101	201.1	13,863	2,344	169.1	8,977	1,387	154.5
District of Columbia	6,364	1,306	205.2	5,449	1,382	253.6	*4,192	*1,283	*306.1
Maine	12,148	1,946	160.2	9,974	1,124	112.7	9,384	912	97.2
Massachusetts	49,756	10,754	216.1	43,102	8,792	204.0	31,752	5,891	185.5
Michigan	33,572	6,570	195.7	24,118	4,667	193.5	19,144	3,744	195.6
New Hampshire	7,400	1,384	187.0	6,856	1,063	155.0	5,503	589	107.0
New Jersey	32,735	7,292	222.7	28,455	6,939	243.8	18,434	4,296	233.0
New York	130,268	25,492	195.7	117,837	25,208	213.9	84,450	16,632	196.9
Rhode Island	8,176	1,854	226.8	7,234	1,490	206.0	4,507	711	157.7
Vermont	5,829	825	141.6	5,261	636	120.9	4,887	591	120.9

* Including still-births, no returns for still-births being given in reports of Tenth Census.

Were the tabulation of the census records of the infant death-rate per 1,000 of living population under 1 year at the end of each census year unaccompanied by tables based on other standards of measuring infant mortality, affording ready means of checking the various figures and thus measuring the probable margin of error, it would be comparatively valueless. For, as previously stated, the census authorities have often admitted that the data regarding the number of living children under 1 year of age are utterly incomplete and inaccurate. As Dr. Farr put it in discussing the mortality of infants (Supplement to 25th Annual Report of the Registrar-General, pp. v-vi), "The infants in the first year of life are to some extent mixed up with infants in the second year of age." And, as Dr. Billings explained in his remarks regarding infantile mortality published in the Report on Vital and Social Statistics in the United States at the Eleventh Census (Part I, p. 21): "Unfortunately, these data are incomplete and inaccurate, not only for the United States as a whole, but for all parts of the registration area. This is due to the fact that the number of children returned as being under 1 year of age is too small in every locality, owing partly to omissions in the enumeration, and partly to the tendency of those reporting the age of infants to report those who are between 9 and 12 months of age as being, in round numbers, 1 year old, which last is a defect common to the censuses of all countries."

The apparent living population under 1 year of age for these reasons being much understated in the returns, of course the alleged rates of deaths under 1 to the living population at that age are almost invariably in excess of the actual rates on that basis: hence the table worked out on those lines would be of little value by itself. The tabulation of rates of infant deaths per 1,000 deaths at all ages probably is open to less objection, but that table, too, is open to much more intelligent interpretation when supplemented with tables prepared on other bases of measurement, and especially with one laid out on the generally accepted plan of death-rates to births. But for the presence of the last-named table, it would not have been considered

worth while to present in this article the two other tables above mentioned.

The death-rate of persons *over 1 year of age* is a natural complement to the death-rate of infants under 1 year, if both are prepared on a common basis, and materially aids in determining whether a high infant mortality is presumably, in part at least, due to unsanitary conditions or to independent causes. In none of the works on the subject of infantile mortality which the writer has examined does such a tabulation appear, and by way of adding at least some information to the statistical records of the subject the following table has been prepared, on the basis of the census reports for 1880, 1890, and 1900:—

TABLE XII.

DEATHS *over 1 YEAR OF AGE* AND RATE PER 1,000 POPULATION *over 1 YEAR* IN 1880, 1890, AND 1900 IN THE REGISTRATION STATES OF 1900, ACCORDING TO THE TENTH, ELEVENTH, AND TWELFTH CENSUS REPORTS.

States.	Census Year 1900.			Census Year 1890.			Census Year 1880.		
	Population over 1 Year of Age at End of Census Year.	Deaths at over 1 Year of Age during Census Year.	Death-rate per 1,000 of that Age.	Population over 1 Year of Age at End of Census Year.	Deaths at over 1 Year of Age during Census Year.	Death-rate per 1,000 of that Age.	Population over 1 Year of Age at End of Census Year.	Deaths at over 1 Year of Age during Census Year.	Death-rate per 1,000 of that Age.
Registration States of 1900	17,064,329	241,146	14.1	14,169,658	208,504	14.7	11,765,518	155,194	13.2
Connecticut . . .	888,646	12,321	13.9	731,789	11,519	15.7	609,821	7,590	12.4
District of Columbia,	273,960	5,058	18.5	225,925	4,067	18.0	173,000	2,909	16.8
Maine	680,963	10,202	15.0	649,928	8,850	13.6	636,124	8,472	13.3
Massachusetts . . .	2,744,854	39,002	14.2	2,195,900	34,310	15.6	1,745,498	25,861	14.8
Michigan	2,366,821	27,002	11.4	2,044,935	19,451	9.5	1,594,352	15,400	9.7
New Hampshire . . .	403,540	6,016	14.9	370,183	5,793	15.6	340,850	4,914	14.4
New Jersey	1,840,098	25,443	13.8	1,412,846	21,516	15.2	1,102,924	14,138	12.8
New York	7,109,373	104,776	14.7	5,872,876	92,629	15.8	4,967,024	67,818	13.7
Rhode Island . . .	419,188	6,322	15.1	338,616	5,744	17.0	270,399	3,796	14.0
Vermont	336,886	5,004	14.9	326,660	4,625	14.2	325,526	4,296	13.2

In so far as the mortality reports of the Tenth, Eleventh, and Twelfth Censuses contribute any really material data to the records of infant mortality in the last three census years in the States recognized as registration States in 1900, the preceding table practically rounds out the information therein obtainable, and it might now seem to be in order to make a comparison of the infant death-rates in the several registration States as measured by the standards of the various tables which have been presented. By so doing, at least an approximate idea of the actual relative rank of the States in question in point of their respective infant death-rates may be obtained, and, possibly, some information of working value be contributed to the rapidly growing bibliography of the subject. Perhaps the shortest and most effective means of reaching this end will be that of assembling at close contact the infant death-rates of each State according to the various standards of calculation employed in the preceding tables, and attaching in each case the numeral showing the relative rank of the State in question from that point of view. In compact form here are the results of an inquiry shaped on those lines, eliminating the District of Columbia for reasons previously explained:—

TABLE XIII.

A COMPARISON OF THE INFANT MORTALITY RATES—AND THEIR COMPLEMENT, THE DEATH-RATE AT ALL AGES *over 1 YEAR*—IN 1900, 1890, AND 1880 IN THE REGISTRATION STATES OF 1900, AND THE RELATIVE RANK OF EACH OF THE NINE STATES IN THE ORDER OF THOSE DEATH-RATES.

States.	Death-rate under 1 Year per 1,000 Births.						Death-rate under 1 Year per 1,000 of that Age living at End of Census Year.					
	1900.		1890.		1880.		1900.		1890.		1880.	
	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.
Connecticut . . .	142.5	6	147.8	6	100.3	5	156.8	6	162.0	6	107.7	5
Maine	132.2	7	95.6	8	67.8	9	144.1	7	100.7	8	71.2	9
Massachusetts . .	160.0	2	182.6	3	142.5	1	177.8	2	204.3	3	156.7	1
Michigan	111.7	9	89.9	9	82.7	7	121.3	9	95.3	9	87.9	7
New Hampshire . .	156.0	3	153.7	5	89.8	6	172.0	3	167.5	5	95.9	6
New Jersey	151.4	4	190.9	2	138.3	2	167.3	4	216.2	2	152.4	2
New York	145.4	5	180.5	4	131.2	3	159.8	5	201.7	4	143.6	3
Rhode Island . . .	177.0	1	192.7	1	107.7	4	197.9	1	216.3	1	115.9	4
Vermont	111.9	8	103.3	7	81.9	8	122.1	8	110.4	7	87.4	8

TABLE XIII.—*Continued.*

States.	Death-rate under 1 Year per 1,000 Deaths at All Ages.						Death-rate for All Ages over 1 Year per 1,000 of Those Ages Living at End of Census Year.					
	1900.		1890.		1880.		1900.		1890.		1880.	
	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.	Rate.	Rank.
Connecticut . . .	201.1	4	169.1	6	154.5	6	13.9	7	15.7	3	12.4	8
Maine	160.2	8	112.7	9	97.2	9	15.0	2	13.6	8	13.3	5
Massachusetts . .	216.1	3	204.0	4	185.5	4	14.2	6	15.6	4	14.8	1
Michigan	195.7	5	193.5	5	195.6	3	11.4	9	9.5	9	9.7	9
New Hampshire . .	187.0	7	155.0	7	107.0	8	14.9	3	15.6	4	14.4	2
New Jersey . . .	222.7	2	243.8	1	233.0	1	13.8	8	15.2	6	12.8	7
New York	195.7	5	213.9	2	196.9	2	14.7	5	15.8	2	13.7	4
Rhode Island . . .	226.8	1	206.0	3	157.7	5	15.1	1	17.0	1	14.0	3
Vermont	141.5	9	120.9	8	120.9	7	14.9	3	14.2	7	13.2	6

A somewhat noticeable feature of this tabulation of comparisons is the fact that, materially differing though the infant death-rates of any particular State do in any one census year as measured by the ratios to births and to living population at the age of 1 at the end of the census year, in every case the relative rank of the State as determined by the two standards remains the same in all three census years. For instance, Massachusetts ranked first in 1880, third in 1890, and second in 1900 in point of both death-rates to births and to living population under age 1 at the end of the census year; New Jersey ranked second in both 1880 and 1890, and fourth in 1900, by both measurements, and so on. In a general way, it might be expected that there probably would be no radical shift in the ranking of the States from census to census in point of either the number of births or the population under age 1 at the end of the census years, but the coincidence of each State's ranking remaining the same in any census year, whether measured by the rate of infant deaths to births or to surviving infants under age 1 at the end of the census year, is at least passing strange, taking into account the habitual and historic inaccuracy in the reporting of living infants under age 1.

Of course, if the infant migration and emigration in a census

year were disregarded, if the infant deaths during the census year were restricted to babies born during the year, and if census returns were complete and absolutely accurate, the number living under age 1 at the end of the year would be the exact complement of the number dying during the year. But the infant migration and emigration cannot be disregarded. A minor but considerable percentage of the infant deaths in any year are those of babies born in the later months of the previous year; and the returns for births, deaths, and living population by ages—especially for population under age 1—are, and always have been, notoriously incomplete and inaccurate. Hence the absolute uniformity of the ranking of each State in the last three censuses, whether measured by its infant mortality rate to births or to living population under age 1, is at least worthy of note.

Unfortunately, the figures of most of the registration States, so far as the infant death-rate to births is concerned, have been open to the suspicion of too glaring inaccuracies—at least up to a very recent period—to warrant any attempt to make comparison between them and those of the European countries with long-established registration systems. But the census returns for these States in 1880, 1890, and 1900, herewith presented for what they are worth, are none the less worthy of a careful study from various view-points by those interested in the subject of infant mortality.

In this paper the writer has aimed to supplement the work of the numerous medical experts, who have long been probing the puzzling problems of infant mortality, by bringing together from various sources and presenting in compact form the most reliable statistical information now obtainable which would warrant some definite conclusions as to the rise or fall of the infant mortality rate in recent years throughout the world, and the apparent present tendencies of the infant death-rate. It has seemed possible that the presentation of specific information on these lines might provide sound foundations, in the way of authoritative facts and figures of international scope, for the widely extended movement now being earnestly

made for the reduction of the infant death-rate. If so, the purpose of this paper will have been served, and possibly in a later paper the writer may present some of the mass of data as to the fundamental causes for the abnormally heavy infant mortality in certain sections—and especially in certain factory towns—which have accumulated in his hands, but have been foreign to the purposes of this preliminary and purely statistical study of the far-reaching subject which is just beginning in these twentieth-century days to make its real importance felt. In the consideration of it, and of the almost innumerable problems involved in it, not only the prospective population, but the general welfare, of the entire civilized world are deeply concerned. As Dr. Alden has so gravely remarked, “A thorough understanding of the subject should be the concern of every true citizen.”

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THE STATISTICAL STUDY OF CAUSES OF DESTITUTION.

BY GUSTAV KLEENE, PROFESSOR OF ECONOMICS, TRINITY COLLEGE.

In regard to the causes of poverty, and of the degree of poverty that may be designated as destitution and leads to dependency, there are found in the literature of the social sciences a few formal discussions, but more frequently only remarks made in passing, or more or less obvious implications. The usual manner of treatment is descriptive rather than analytic, and is confined to particular causes and conditions. Professor Warner, one of the few writers who have aimed at a comprehensive treatment of the subject, points out that three tolerably distinct methods of investigation have been tried. First, there is the method of writers like Malthus, Marx, and Henry George, "who from the well-known facts of social organization have sought to deduce the causes tending to poverty." Secondly, there is the study of "the classes not yet pauperized to determine by induction what forces are tending to crowd individuals downward across the pauper line. . . . The best example of such work is probably that of Mr. Charles Booth in his 'Labor and Life of the People.' Almost all of the reports of our labor statisticians, the works on occupational mortality and morbidity, and in fact everything of a descriptive nature that has been written about modern industrial society, can be used in this second method of seeking for the causes of poverty." Thirdly, there is the "inductive study of concrete masses of pauperism, usually separating the mass into its individual units, seeking to ascertain in a large number of particular cases what causes have operated to bring about destitution."

* *American Charities*, pp. 22-117. See also articles by Professor Warner in Volumes I and IV of the Publications of the American Statistical Association.

It is proposed in the following to examine the third method only. This method, that of *case-counting*, has been applied by Warner to the records of American charity organization societies and by Charles Booth to English paupers. The National Conference of Charities some years ago appointed a committee to prepare a statistical blank for the use of charity organization societies in collecting data for studies of this kind. Mr. Booth sought for each case the "principal or obvious" and one "contributing" cause, and has tabulated his data so as to show the number of cases of pauperism attributable to each cause as principal, and also the number of cases attributable to each combination of principal and contributory cause. The following is taken from his tabulation of almshouse paupers at Stepney:—

Principal or Obvious Cause.	Total.	Per Cent.	Contributory Causes.			
			Drink.	Pauper Association and Heredity.	Sickness.	Old Age.
1. Drink	80	12.6	—	23	11	11
2. Immorality	16	2.5	3	3	3	1
3. Laziness	12	1.9	6	5	1	3
4. Incapacity; temper, etc.	24	3.8	4	5	2	6
5. Extravagance	8	1.3	4	2	—	3
6. Lack of work or trade misfortune	28	4.4	4	—	5	13
7. Accident	30	4.7	4	2	1	14
8. Death of husband	26	4.1	3	2	10	8
9. Desertion	3	.5	3	—	1	1
10. Mental derangement	11	1.7	1	2	—	2
11. Sickness	169	26.7	24	38	5	41
12. Old age	208	32.8	22	18	44	—
13. Pauper association and heredity	7	1.1	1	—	2	2
14. Other causes	12	1.9	6	6	2	2

Professor Warner gives only the number and percentage of cases attributable to each cause as principal (see Table IV, *American Charities*). He admits that this is unsatisfactory because there are few cases in which destitution has resulted from a single cause, and for many cases "to pick out one cause and call it the most important is a purely arbitrary proceeding." He proposed at one of the meetings of the Na-

tional Conference of Charities "to consider the influences result.

Report from
BALTIMORE.
BOSTON.
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ST. PANCRAE.
76 GERMAN CITIES.

~~the proposed method~~

ing. He proposed at one of the meetings of the

tional Conference of Charities "to consider the influences resulting in destitution in each case as making up ten units, and indicate the relative force of each cause by a proportionate number of units." The method was rejected as too complicated, but has been used by Mr. A. M. Simons in a study of cases treated by the Chicago Bureau of Associated Charities.* The tabulated results are as follows:—

	Stock Yards District.	Englewood.
Lack of employment	456	499
Intemperance	157	105
Sickness	154	95
Incompetence	61	36
Desertion of breadwinner	51	22
Laziness	34	160
Old age	33	54
Death of breadwinner	33	29
Pauper association	17	0
Insanity	4	0

In Professor Lindsay's report to the National Conference† the method employed by Warner is used. A condensed statement is here given:‡—

A. Causes indicating misconduct:

Drink, 5-23; immorality, none; shiftlessness and inefficiency, 4.93-14; crime and dishonesty, 0-1.5; roving disposition, 0-3.26.

B. Causes indicating misfortune:

a. Lack of normal support.

Imprisonment of breadwinner, 0-2; orphans and abandoned children, 0-1.5; neglect by relatives, 0-2.3; no male support, 3.6-7.22.

* *American Journal of Sociology*, vol. iii.

† Report National Conference of Charities, 1899, p. 369.

‡ The numbers in this statement are percentages of cases. The range from the lowest percentage in any city for one year to the highest is given. Thus the lowest percentage assigned to drink is five for the year 1894-95 in Baltimore, the highest is twenty-three per centum for the year 1889-90, and also for 1892-93 in Boston. The cities studied are: New York, 1889-98; Boston, 1889-93; and Baltimore, 1889-95.

b. Matters of employment.

Lack of employment, 12-37.67; insufficient employment, 0-14.47; poorly paid employment, 0-10.5; unhealthy and dangerous employment, 0-.6.

c. Matters of personal capacity.

Ignorance of English, 0-1; accident, 1.2-5; sickness or death in family, 13.75-26.50; physical defects, 1.28-7; insanity, .25-1; old age, 0-7.

C. Not classified:

Large family, 0-4.5; nature of abode, 0-1; other or unknown, .35-10.

What can be said of the scientific value of these studies? The case-counting method, dealing as it does with actual cases, with the "facts," seems at first sight to offer the most direct line of approach to the problem. Its statistical appearance arouses the hope that the effect of various causes may be measured and the importance of causes disclosed by quantitative comparison. Upon the important causes ameliorative efforts could then be concentrated, and the practical value of this method of study be demonstrated. Closer examination, however, will show that suggestive as the study of concrete cases of destitution may be, nothing is gained by the application of statistical methods. In other words, the relative weight of causes of poverty cannot be established by counting cases.

In the first place the data used are cases of dependency, not of destitution. Agencies of relief are not yet so discriminating as to exclude from assistance all who are not destitute and none who are. The number of dependents therefore does not coincide with the number of the destitute. Assuming, however, that the correspondence between these two classes is sufficient to permit inferences drawn from the study of one to be applied, without qualification, to the other, we are confronted with a more serious difficulty. Mere number of cases attributable to a given cause is not an accurate index of its effect. A hundred slight cases obviously cannot be regarded as the equivalent of a hundred serious ones. It will be neces-

sary, therefore, to ascertain the degree or amount of destitution in each case due to a given cause, if the total effect of this cause is to be summed up in such manner as to make possible comparison with other causes. Comparison of the effect of different factors would be a simple matter if (1) each case were due to only one cause and (2) there were some method by which degree of destitution could be measured. Usually there are many causes for each case. The method suggested by Professor Warner and employed by Mr. Simons of assigning ten units to each case and indicating the relative force of each of the causes at work by its proportionate share of these ten units would be only a very rough index of the proportion of the destitution of a particular case due to a given cause, and fails to allow for the differences in amount of destitution of the different cases. The degree of want in each instance, however, cannot even be approximated. If the only ideally correct method of indicating the relative weight of causes be insisted on, the case-counting method becomes impossible.

If it be granted that it is legitimate to follow Warner, Simons, and others in treating all cases as of equal value, the results are yet inevitably so incomplete and subject to such large allowance for possible errors as to be worthless for scientific purposes. First, be it observed that not all the destitute of any community or country are taken, but only certain groups, as, for instance, charity organization society cases and almshouse inmates. Out of these groups can be selected only those individuals or families concerning whom the recorded information has an appearance of completeness. Transient cases cannot be considered. The group of cases investigated constitutes a small fraction of the whole number of the destitute, and may be not at all representative. Moreover, the different studies of this kind cannot be combined. Between the two groups hitherto studied, almshouse inmates and charity organization society cases, there are important differences. The families or individuals that the societies have under treatment for some length of time and concerning whom, therefore,

the information gathered is sufficient to permit an entry in the "statistical blank," are ordinarily of a distinctly higher grade than the "sodden driftwood" of the average almshouse. If the numerical data concerning these two groups are to be combined, each group must be "weighted" according to the percentage it constitutes of the whole number of the destitute. Owing to insufficiency of data and differences of classification and terminology, such combination of results is, and for a long time will be, unattainable. The study of charity organization society cases only is pursued, in this country, in such manner as to promise results, and to this group the following discussion of the case-counting method will be confined. That it is difficult to secure adequate information even concerning these cases no one who has had experience in investigation and relief work can deny. The subjects of investigation, the human beings designated as *cases*, may have reasons for deception and concealment, and at all events their testimony concerning themselves, one of the main sources of information, is biased and incomplete. It should further be observed that "investigations" or "visits" are made primarily not for a scientific, but for a practical purpose, by overworked, hurried, and sometimes inexperienced agents. A very small number of facts concerning an individual or family may be decisive as to the practical measures to be taken. These entered on the "record card" do not present to the statistician looking for data to tabulate a sufficiently complete view of the condition and history of the family or individual to warrant inferences in regard to the cause of distress. Many a practical worker, seeing how decisive facts may remain undiscovered till almost the very close of the investigation or course of treatment, must have been haunted by the thought that perhaps one hour more devoted to some case might have revealed facts overthrowing the conclusions reached, and that serious mistakes may have been committed. Are we not all convinced by our own experiences that the decisive factors in the lives of many are so elusive that years of acquaintance may fail to disclose them? Somewhere, however, because of the merciless flight of time,

an investigation must be closed and the incomplete record allowed to stand.

Some factors, because not easily discovered, are credited with too small a proportion of cases, and, unless these cases are assigned to the caption "Unknown," the percentages left to other causes are thereby unduly increased. In Warner's table "crime and dishonesty" are credited with 3 per cent. from Cincinnati in the year 1891-92 (but only .7 per cent. for the previous year), and from other cities are not held to account for more than 1.5 * per cent. in any year, and for most years no figure appears under this head. These numbers certainly give no adequate idea of the many who fail to keep employment because of petty acts of dishonesty or because they are *felt* to be unreliable. Concerning the numerous suspected but not proven acts no testimony whatever is likely to reach the charity organization society visitor. Even flagrant offences are not willingly disclosed by those who have detected them. The inquirer is frequently impressed by the unwillingness of employers to disparage the character of persons they have discharged and would not be willing to employ again. Another striking example of a forgotten cause is *immorality*. No percentage whatever is attributed to it in the charity organization society cases, and the heading "Immorality" in Warner's table serves no purpose except to include Mr. Booth's data concerning English paupers. Health and character are so undermined by this cause that unemployment and destitution are highly probable results. That it is wide-spread there are grounds for suspecting. Certain evidence, however, is not to be obtained. In spite of widely prevailing cynicism the charity visitor seeking information finds a remarkable reticence. Men and women are only suspected, not convicted, of sexual license. What charity worker would venture to set down such a suspicion in black and white? How many there are that would hesitate to record even certain knowledge! The record cards of charity organization societies, therefore, contain no evidence of this wide-spread and active cause of poverty.

* The highest percentage, it will be observed, in Professor Lindsay's table.

And now we come to the fundamental difficulty of the case-counting method. It has employed data for only a small proportion of the world's destitution, and incomplete information at best in all cases. Yet, if all the facts open to observation and record were given, their *interpretation* would meet insuperable difficulties. How is one to pick out a "principal" cause from a tangle of interacting forces? Take this entirely possible instance suggested by A. M. Simons:*

"The husband, a not very competent workman, and an occasional drinker, is thrown out of employment by the stopping of the factory where he has been working. A child falls sick; owing to defective drainage, and this unusual expense causes him to allow his trades-union dues to lapse just before a period of general financial depression. Discouraged and tired of 'looking for work' and his resources exhausted, he applies for charity. Is the 'cause of distress' lack of employment, incompetency, intemperance, sickness, bad sanitation, trade-unionism, or 'general social conditions' beyond the control of the individual?"

How far back of the immediate cause is it permissible to go? Warner holds that the method should deal only with immediate causes, and therefore objects to the inclusion in the list of causes of "pauper association and heredity" and of "nature and location of abode." "Both of these," he states, "are by their nature predisposing causes rather than immediate or exciting causes; and it is confusing to mix the two." Dr. Ayers,† however, in discussing the new blank prepared by the committee of the National Conference, advises that:—"In cases where it is doubtful which of several causes should be indicated, some within and some outside the family, the emphasis should be thrown upon the primary cause, st it is surely known and can be stated. A suggestion from the Baltimore Charity Organization Society may be safely followed: 'Give the cause that is farthest back provided you really know it!'" Evidently there is no agreement as to the object of the inquiry.

* *American Journal of Sociology*, vol. iii.

† *Charities Review*, December, 1898.

In many instances the chain of causes appears to return upon itself, the effect becoming a cause and forming, in a sense, a "vicious circle." A man is destitute because of unemployment, unemployed because of physical weakness, weak because of nature of abode and insufficiency of nutritious food, confined to insanitary dwelling-places and poorly fed and depressed because of his destitution. What point in this circle should be selected for tabulation? Obviously, the latitude that must be given to individual judgment puts agreement out of question. The individual judgments, though issuing in a numerical statement with all the delusive aspect of exactness that "figures" give, are the outcome of a struggle in the investigator's mind between indeterminate factors. Prejudice or, in more courteous phrase, the "personal equation" decides what part of a circular causal movement will be designated or how far back of the immediate causes the inquiry will be pushed. Moreover, the investigator's judgment is not likely to be entirely undisturbed by strong feeling. In regard to the subject of intemperance, for instance, an American until recently found it difficult to think calmly. He abominated either the liquor traffic or the frenzied language of the temperance advocate. That the bias of one student will exactly offset that of another is by no means certain.* The nature and amount of popular discussion given to any factor largely determines the bulk it assumes in each investigator's mind. Intemperance as a cause of destitution cannot be disregarded. "Nature of abode," however, has been overlooked. The small percentage of cases attributed to it (2.2 and 1 at the highest in Warner's and Lindsay's tables, respectively, and nothing for most cities) will astonish any one acquainted with the life of tenement districts. The attention given to housing conditions in recent years and the impression made upon the public mind will possibly be reflected in future tabulations, and result in some approach to a correct

* Professor Warner refers to the tendency of bias to become corrected in grand totals, and then suggests that variation is, after all, rather slight. Thus "causes indicating misconduct vary only between 7.5 and 32.5." This *only* is almost ludicrous. If variations of 25 points are to be regarded as trivial, the use of numerical data can have little meaning.

percentage. Such tables are, however, at best but records of the more or less confused impressions and reactions of more or less prejudiced minds. They indicate the course of popular thought and feeling, of subjective rather than of objective conditions. They can never give a rightly proportioned picture of the facts. How widely they depart from the reality it is idle to inquire.

A statistical blank such as that formerly recommended by the National Conference is, by its very nature, misleading. Consisting of a list of causes, headings under which data are to be entered, its use can be defended only on the assumption that the list is exhaustive so far as causes that can be considered *principal* are concerned, or that the omitted causes are a negligible quantity. Such listing leads to the oversight of causes not listed. The caption "Causes not named or unknown" is an insufficient safeguard. Placed at the end of the list, it attracts too little notice. Attention is inevitably centred upon the more conspicuous headings. The causes indicated by them occupy the mind at the outset of the inquiry, and, as in all human observation, what is expected and, therefore, almost desired, is, of course, discovered. Nothing would be gained, however, if each student were to make his own list of causes. Uniformity of terminology (that is, a statistical blank) is necessary if there is to be any tabulation of the combined results of different investigators. The very means necessary to a statistical study, however, renders it impossible to indicate the true proportions of *all* the factors creating destitution. A blank form, therefore, should not be used in a study of the entire subject. At best, a blank could exhibit the relative *prominence*—not relative *importance*—of a small number of causes. For such a purpose the proposed blank of the National Conference could be adapted by the omission of causes that are inconspicuous.* The difficulty of securing accurate and complete data and of interpreting

* Dr. Ayers states that the committee of the Conference revising the statistical blank in 1898 "was guided by the opinion that those headings in the old form that had shown only very small percentages should either be omitted or joined with other headings."

them, however, makes it clear that even the attempt to compare only a few conspicuous causes can lead to no trustworthy conclusions.

The case-counting method, we may conclude, is, and always will be, a complete failure. Comparing causes, not by any possible accurate measure of their effects, but by counting cases and assuming that they are of equal value; taking into consideration only a small proportion of the total of cases without assurance that those taken are truly representative of the whole; based for the cases actually investigated on incomplete data and on the untenable assumption that a principal cause may be picked out from a tangled network of causes; limited artificially to a printed list of causes suggested by the dominant interests of the time in advance of any real investigation,—it throws light neither on what is fundamental nor on the relative importance of the superficial phenomena and it gives no adequate study of any distinct class of the destitute or trustworthy comparison of any special groups of causes. It follows, as a matter of course, that it can yield no conclusion of sufficient generality to be of service in establishing principles of poor-relief. A few factors, indeed, in such a study acquire prominence,—intemperance, matters of employment, sickness. That these are in numerous cases among the immediate causes of distress may be granted. General observation will lead to that conclusion, and statistical proof is unnecessary. The only legitimate inference, however, is that of all the forces at work they are the conspicuous ones. It is not proved that they are the most important.

Warner appears to draw a general conclusion from his statistical study by selecting from the list of causes those of large percentages (intemperance, sickness, etc.) and showing that these imply *weakness*, physical, mental, or moral. He concludes that “the commonest exciting cause of the poverty that approaches pauperism is incapacity. Weakness of some sort is the most typical characteristic of the destitute classes.” Almost every cause in the entire list, however, whether numeri-

cally prominent or not, could, by a similar method of reasoning, be shown to rest on weakness. The numerical data, therefore, are not necessary to the conclusion. Given merely a list of causes, such as may be obtained by general observation, an analysis of the list will show personal weakness as an all-pervading element. Objection may be made to Warner's conclusion, moreover, not only on the ground that it is reached by unnecessary and faulty statistical operations, but that it is incomplete. Analysis carried further will show that weakness is relative to the forces with which personality must contend; *i.e.*, the environment. The fundamental factors could be grouped under "personality" and "environment," but which group is the more important it is not possible to determine.*

The writer does not wish to imply that all study of concrete cases of destitution is without value. It is to the attempt

* Some publications of later date than those considered above indicate that doubts are beginning to arise in regard to the value of the case-counting method. Professor T. S. Adams (Adams and Sumner, "Labor Problems," 1905, p. 150), citing Warner's data, remarks that "such figures can never reveal the fundamental or original causes of poverty, and they must be used with great caution." Professors Mayo-Smith and Giddings, in reporting as a committee in 1899 on an investigation of this kind, say: "The committee does not lay any particular stress on the results of this inquiry. The question seems to be too difficult for the rough method of statistics." (Seventeenth Annual Report of the C. O. S. of New York City, p. 61.) A report of the Committee on Social Research of the New York Charity Organization Society (Twenty-third Annual Report, p. 86) declares a study based on opinions or impressions of charity organization society agents in regard to principal causes of poverty to be "unscientific." "It is felt that much more valuable results will follow from a study of actual conditions, such as sickness, lack of work, and drunkenness. . . . By carefully noting the associated conditions in every case, and tabulating the number of instances of such associated conditions, it will be possible to arrive, in the course of time, at a knowledge which shall be based on facts, and not on impressions." In future reports the committee hopes to establish "correlations" between "conditions and circumstances," which "will form a basis for conclusions as to causes." Here appears a lingering hope that statistical study may yet lead to conclusions. In recent years the Committee on Statistics of the National Conference of Charities and Corrections has not countenanced the case-counting method. "Most of us," writes one member, "have come to see that the old method of studying causes of poverty was an unfortunate one. . . . It was unfortunate for two reasons: first, because it meant reliance on opinions, not on facts; and, second, because the burden of deciding whether it was intemperance, lack of work, unwise philanthropy, inefficiency, or illness in a given case that brought the family to dependence, and the conviction that the decision could not be of much value, did much to make statistics in general hateful to charity workers." (Lilian Brandt in Proceedings of the National Conference, 1906, p. 426.) The schedule drawn by the committee and adopted at the Minneapolis meeting in 1907 did not use the old blank as a model. In fact, it was merely "designed to exhibit the general activities of societies dealing with needy persons in their homes," and calls for such data as number of cases dealt with, expenditures, number of volunteer workers, etc.

to *measure* causes that objection is made. If not cribbed and confined by a statistical schedule to specifically listed causes, it is possible that the study of concrete data may lead to the discovery of neglected factors or causes as yet unknown. A detailed study of individuals or families, a monographic method like that of the Le Play School, may prove useful. In providing a starting-point for an effort to trace causal antecedents in the chain and network of forces, such studies may contribute more to the satisfaction of the scientific temperament and to the illumination of the problem of poor-relief than any attempt at the measurement of the area over which given causes act. When we consider how causes are interlaced, how interdependent and inseparable are individual and environment, racial trait and social structure, it appears impossible to make any statement of the importance of causes in terms of relative magnitude. The only general conclusions of value, in the opinion of the writer, that can be drawn from a study of the causes of poverty, refer to the permanency or removability of the different forces at work. Nothing is really permanent, but what in a comparative sense may be called permanent factors constitute fixed points, hard facts, to which the practice of poor-relief must accommodate itself. The removable, on the other hand, should be studied with reference to the method, and perhaps in some cases the desirability, of removing. This is the point of view suggested, when it is borne in mind that, after all, the chief motive in a study of the subject is the desire to find guiding principles in the relief of human suffering.

REVIEWS.

Annual Report of the Department of Health of the City of Minneapolis for the Year ending December 31, 1907.

This report is noticed here because it illustrates a common fallacy in vital statistics. On the first page of the report the Commissioner of Health makes the following statements: "The total number of deaths for the year was 2,959, 135 more than were recorded during 1906. Deducting babies under one week of age, violent deaths, and deaths of non-residents who are brought into our hospitals for treatment, computed on an estimated population of 300,000, the death-rate per thousand is 8.56. This makes Minneapolis the healthiest city in the United States, as no other city of its size can show so low a death-rate."

There have been many attempts on the part of health officers to make an exceptionally good showing by misstatements of facts or by the use of fallacious methods of calculating death-rates. For a statement in three sentences, however, embodying four fallacies to reach a doubtful conclusion, the above quotation is quite typical.

First, it may be asked why the estimated population of Minneapolis was limited to 300,000? To be sure, the Census Office at Washington by their methods would give the city credit for only 285,676 population, or 14,324 less than the above guess of 300,000. While guessing, however, it would be just as easy to make the population 350,000 as 300,000, and it would make the city appear to be healthier.

Second, why stop with the elimination of the deaths of children under one week of age? As this is a purely arbitrary deduction, why not strike out the deaths of children under two, or, better, four weeks of age? This would obviously make the city appear to be considerably more healthy, and possibly Minneapolis would then become the most healthy city in the world. If the health of a city is to be determined by statistical juggling, then the more slow and tedious sanitary processes used in some of the less healthy cities of the United States could be discarded. Why, for instance, attempt to improve milk and water supplies, rigidly inspect food supplies, clean streets, etc., when an easier method yields quicker results?

Third, why deduct deaths from violence from the grand total in calculating the general death-rate? As a matter of fact, some deaths classi-

fied as violent are dependent, to some degree at least, upon climate and other local factors. For example, deaths by sunstroke are classified as violent deaths, but it is obvious that this cause varies in importance with local conditions, including climate. Some authorities, too, presume to think that there is a more or less intimate relation between disease prevalence and accidents. If it is proper to deduct deaths by violence from the grand total of deaths to make a city appear to be healthy, it may be suggested, for the benefit of a rival city, that it would be just as logical to deduct deaths from ill-defined causes, deaths due to old age, and that considerable number of deaths reported as due to "heart failure." If a person dies of old age in a given city, that, of itself, is one of the surest signs that the city is healthy. So why should the death count against the fair reputation of the city by being included in the calculation of its death-rate? Death by "heart failure" may or may not be due to general health and sanitary conditions; but why not give the city the benefit of the doubt, and throw them all out? Obviously, such ill-defined causes as dropsy, found dead, sudden death, etc., should all be eliminated in the manufacture of a healthy city.

Fourth, deaths of non-residents are eliminated from the death-rate calculations in Minneapolis. If care was taken to include in the death-rate (or, better, health-rate) all of the residents of Minneapolis who happened to die outside of the city and some of whose bodies would almost certainly be interred elsewhere, then it might have been excusable to deduct the deaths of non-residents treated in Minneapolis hospitals. It is a poor rule, however, which does not work both ways.

Finally, it may be asked whether the children under one week of age, the non-residents and the decedents by violence, were all carefully deducted from the estimated population. A novice in mathematics can easily see that, if they were not permitted to appear in the dividend, they should also have been cast out of the divisor in the calculation of the "corrected" death-rate. The report does not indicate how many non-residents and children under one week of age died in Minneapolis during 1907. These omissions make it impossible to judge of the importance of the two items, but the 300,000 estimate of population must have included all infants, non-residents, etc., with a few others added for good measure.

A few other cities, notably New York in its weekly health reports, publish what they are pleased to call "corrected" death-rates, in the calculation of which deaths of non-residents and infants under one week of age are excluded. This method, however, is not favored by the highest authorities in vital statistics, and there does not appear to be one sound argument in its favor. In any event the "uncorrected" death-rates should be given, as in the New York reports, so that fair comparison can be made with other cities. To say the least, it is un-

fair to the other less healthy cities to be branded without the chance to get at the real facts in the case.

The writer has no sympathy with attempts to mislead the public by juggling with the death returns. Minneapolis is a comparatively healthy city when judged by its annual death-rate as calculated by the standard methods. Whether it is or is not "the healthiest city in the United States" is a matter of some doubt and less importance. Other cities could doubtless materially improve their published death-rates if, as we hope they will not, they were to copy the fallacious methods used by the Commissioner of Health of Minneapolis.

F. S. CRUM.

A LIST OF RECENT STATISTICAL PUBLICATIONS.*

BY THOMAS J. HOMER.

I.

THEORY AND METHOD.

- BENEDUCE, ALBERTO. Rassegna del movimento scientifico. Statistica. (In *Giorn. d. econ.*, April, 1908.)
Discusses the recent work of Karl Pearson, Wm. Palin Elderton, and F. P. Cantelli.
- BENINI, RODOLFO. Principii di statistica metodologica. Torino: Unione tipogr. 1906. 353 pp. 8°.
Reviewed in the *Giornale degli economisti*, ser. 2, vol. 32, p. 586. Rome.
- BERTILLON, JACQUES. Curso elemental de estadística administrativa. Obra ajustada al programa acordado por el Consejo superior de estadística para el examen de ingreso en las diversas oficinas públicas. Traducido por Antonio Revenga. Madrid: Reus. 1907. 635 pp.
- BOWLEY, ARTHUR LYON. Elements of statistics. 3d edition. London: King. 1908. 348 pp. 8°.
- BRUNS, ERNST HEINRICH. Wahrscheinlichkeitsrechnung und Kollektivmasslehre. Leipzig: Teubner. 1906. viii, 328 pp. 8°.
Deals with the "doctrine of collective quantities"; and discusses the representation of statistical frequency by a series.
- CARONCINI, ALBERTO. Note di metodo sulla statistica degli scioperi. (In *Giorn. d. econ.* for Dec., 1905, and Jan., 1906.)
- CONFERENCE [8TH] OF STATISTICIANS OF THE COMMONWEALTH AND STATES OF AUSTRALIA AND COLONY OF NEW ZEALAND. MELBOURNE, NOV. AND DEC., 1906. Australasia. Unification of Australasian statistical methods and co-ordination of the work of the Commonwealth and State Bureaus. Melbourne: Kemp. 1906. 73 pp. Fol.
Rev. in *Royal Statistical Society. Journal*. Vol. 70, p. 663. See also p. 582.

* This list, which will be continued in the December issue, does not pretend to be exhaustive or critical; but it is hoped that it may prove serviceable for purposes of reference. The several other classes of statistical publications will be dealt with in future numbers.

- CONTENTO, ALDO. La statistica del movimento migratorio e il calcolo dell' aumento della popolazione. (In *Giorn. d. econ.*, Rome, for Nov., 1906.)
- DILKE, CHARLES W. [On official statistics.] Presidential address (Royal Statistical Society). (In *Roy. Stat. Soc. Journal*, vol. 70, pp. 553-582. London.)
 "A plea for co-ordination of official statistics and statistical methods."
- EDGEWORTH, F. Y. On the representation of statistical frequency by a series. (In *R. S. S. Journal*, vol. 70, pp. 102-106. 1907.)
- . On the probable errors of frequency-constants. (In *R. S. S. Journal*, vol. 71, pp. 381-397. 1908.) *To be continued.*
- ELDERTON, WILLIAM PALIN. Frequency-curves and correlation. Published for the Institute of Actuaries. London: Layton. [1906.] xiii, 172 pp. 8°.
 Books, references, etc., pp. 163-165. Rev. in *R. S. S. Journal*, vol. 70, p. 132.
- FORNASARI DI VERCE, E. Statistiche agrarie; studio di metodologia statistica. (In *Giorn. d. econ.*, Rome, for Sept. and Oct., 1906.)
- GRYZANOVSKI, ERNST G. F. On collective phenomena and the scientific value of statistical data. (In *American Economic Association. Publications.* 3d ser., vol. 7, no. 3. 1906.)
 With an introduction by Frederick Tuckerman.
- JACQUART, CAMILLE. Statistique et science sociale. Aperçus généraux. (Conférences données à l'Institut supérieur de philosophie de Louvain.) Bruxelles: Desclée, De Brouwer & Cie. 1907. 120 (1) pp. 16°.
- JAECKEL, REINHOLD. Zur Bevölkerungsstatistik und Bevölkerungswissenschaft. (Unter Zugrundelegung der neueren Literatur.) 1907. 45 pp. 8°.
- KAPTEYN, JACOBUS CORNELIUS. Statistical methods in stellar astronomy. Diagrams. (In Congress of Arts and Science. . . . St. Louis, 1904. Vol. 4, pp. 396-425. Boston. 1906.)
- KNIBBS, GEORGE HANDLEY. The classification of disease and causes of death, from the standpoint of the statistician. Melbourne: Intercolonial Medical Journal. 1907. 24 pp. 8°.
 Rev. in *R. S. S. Journal*, vol. 70, p. 662. The author is "Commonwealth Statistician."
- LAURENT, HERMANN. Statistique mathématique. Paris: Doin. 1908. vi, 272 pp. 8°.
 Rev. in *R. S. S. Journal*, vol. 71, p. 406.

- MALLET, BERNARD. A method of estimating capital wealth from the estate duty statistics. (In *R. S. S. Journal*, vol. 71, pp. 65-84. 1908.)
- MICHEL, E. Statistiques et monographie. Lecture à l'Association normande (Congrès de Bayeux, 1906). Caën: Delesques. 1907. 11 pp. Tables. 8°.
- NINA, L. Principi fondamentali di statistica. Turin: Bocca. 1907. 182 pp. 8°.
- PEARSON, KARL. On further methods of determining correlation. London: Dulau. 1907. 39 pp. 4°.
Rev. in *R. S. S. Journal*, vol. 70, p. 655.
- PRATO, GIUSEPPE. Rassegne statistiche ed economiche. Turin: Soc. tip. editr. nazionale. 1908. 313 pp. 16°. [University of Turin. Economic laboratory studies. 3.]
A work on statistical theory and practice.
- SCHNAPPER-ARNDT, GOTTLIEB. Sozialstatistik. (Vorlesungen über Bevölkerungslehre, Wirtschafts- und Moralstatistik.) Leipzig: Klinkhardt. 1908. xxii, 642 pp. Illus. 8°.
Edited by Dr. Leon Zeitlin. Rev. in *R. S. S. Journal*, vol. 71, p. 222; and in the *Economic Bulletin* for April, 1908, p. 52.
- UNITED STATES. *Census Bureau*. Modes of statement of cause of death and duration of illness upon certificates of death. Comparison of forms . . . [with those of] other countries and suggestion of a modification of the standard certificate to secure uniform and definite statements of causes of death. [Washington. 1907.] 81 pp. Map. Facsimiles. 8°.
Check list of registration officials, and of reports and bulletins containing vital statistics in the United States, pp. 71-81.
- UNITED STATES. *Census Bureau*. Special reports. Supplementary analysis and derivative tables. Washington. 1906. xviii, 1144 pp.
A special supplementary report on the 12th Census, prepared under the supervision of Walter F. Willcox,—an analysis and interpretation of statistics (particularly those of population) contained in the main reports.
- WEBB, MRS. SIDNEY. [Methods of investigation.] (In *Sociological papers*. Published for the Sociological Society. Vol. iii. London. 1907.)
Briefly discusses "the function of statistical method in sociology."
- WELLS, FREDERIC LYMAN. Statistical study of literary merit, with remarks on some new phases of the method. New York: Science Press. 1907. 30 pp. Diagrams. 8°.
- ZIMMERMAN, FRIEDRICH W. R. Die deutsche Handelsstatistik in ihre geschichtlichen Entwicklung und ihrem derzeitigen

Stand. (In *Jahrbücher für Nationalökonomie und Statistik*. Jena. Concluded in the issue for April, 1908.)

II.

CURRENT PERIODICALS.

ABBREVIATIONS.

Bi-m. = Bi-monthly.	Semi-a. = Semi-annually.
Irreg. = Irregularly.	Semi-m. = Semi-monthly.
M. = Monthly.	W. = Weekly.
N. s. = New series.	Y. = Yearly.
Q. = Quarterly.	

ALLGEMEINES STATISTISCHES ARCHIV. Herausgegeben von Georg von Mayr. Tübingen. Semi-a. 1890+.

AMERICAN STATISTICAL ASSOCIATION. Boston. Publications. N. s. Q. 1888+.

ARCHIV FÜR SOZIALWISSENSCHAFT UND SOZIALPOLITIK. *Formerly called* Archiv für soziale Gesetzgebung und Statistik. Begründet v. Heinrich Braun. Herausg. v. W. Sombart, M. Weber, und E. Jaffé. Tübingen, Berlin. Q. 1888+.

THE BANKERS', INSURANCE MANAGERS', AND AGENTS' MAGAZINE. [The Bankers' Magazine.] A journal of banking, actuarial and financial statistics. London. M. 1844+.

BIOMETRIKA. A journal for the statistical study of biological problems. Edited, in consultation with Francis Galton, by W. F. R. Weldon, Karl Pearson, and C. B. Davenport. Cambridge (Engl.). Q. 1901-02+.

BULLETIN Russe DE STATISTIQUE FINANCIÈRE ET LÉGISLATION. St. Petersburg. M. 1894+.

DEUTSCHER RUNDSCHAU FÜR GEOGRAPHIE UND STATISTIK. Wien. M. 1879+.

FRANKFURTER VEREIN FÜR GEOGRAPHIE UND STATISTIK. Jahresbericht. Frankfurt am Main. Y. 1836+.

INSTITUT INTERNATIONAL DE STATISTIQUE. Bulletin. Rome. Irreg. 1885+.

JAHRBÜCHER FÜR NATIONALÖKONOMIE UND STATISTIK. [CONRAD'S.] Begründet v. Bruno Hildebrand. Jena. M. 1863+.

JOURNAL DES ÉCONOMISTES. Revue mensuelle de la science économique et de la statistique. Paris. M. 1843+.

MANCHESTER STATISTICAL SOCIETY. Transactions. Manchester (Engl.). Y. 1887-88+.

MONATSSCHRIFT FÜR KRIMINAL-PSYCHOLOGIE UND STRAF-
RECHTSREFORM . . . Hrsg. v. . . . Gustav Aschaffenburg.
Heidelberg. M. 1904 +.

Gives special attention to criminal statistics, particularly to the discussion of official criminal statistics.

REVUE DE STATISTIQUE. Paris. W. 1898 +.

ROYAL STATISTICAL SOCIETY. Journal. London. Q. 1838 +.

SAMMLUNG NATIONALÖKONOMISCHER UND STATISTISCHER ABHAND-
LUNGEN DES STAATSWISSENSCHAFTLICHEN SEMINARS ZU HALLE
A. D. S. Hrsg. v. Joh. Conrad. Jena. Irreg. 1877 +.

SOCIÉTÉ DE STATISTIQUE DE PARIS. Journal. Paris. M.
1860 +.

STATISTICAL AND SOCIAL INQUIRY SOCIETY OF IRELAND. Journal.
Dublin. Y. 1855 +.

THE STATISTICAL SOCIETY OF SOUTH AFRICA. Publications.
Johannesburg. 1907 +.

STATISTISK TIDSKRIFT: UTGIFVEN AF KUNGL. STATISTISKA CEN-
TRALBYRÅN. Stockholm. 1862 +.

STATSVETENSKAPLIG TIDSKRIFT FOER POLITIK, STATISTIK, EKONOMI.
Upsala. 1897 +.

VEREENIGING VOOR DE STAATHUISHOUDKUNDE EN DE STATISTIEK.
Verslag van de algemeene vergadering, gehouden te Amster-
dam den 5en October 1907. Amsterdam: Joh. Müller.
24, 70 pp. Roy. 8°.

ZEITSCHRIFT FÜR SCHWEIZERISCHE STATISTIK. (Schweizerische
statistische Gesellschaft und Eidgenössisches statistisches
Bureau.) Berne. Irreg. 1865 +.

AMERICAN STATISTICAL ASSOCIATION.

NEW SERIES, No. 84

DECEMBER, 1908.

UNIFORMITY AND CO-OPERATION IN THE CENSUS METHODS OF THE REPUBLICS OF THE AMERICAN CONTINENT.*

By S. N. D. North.

To the United States of America belongs the unique distinction of having inaugurated the decennial census of national population and resources. The census of the population was ordained by the Constitution in 1790, and for every tenth year thereafter, as long as the nation shall endure.

A census was necessary as a basis for Congressional apportionment, and no other reason was assigned for it in the Constitution. But it quickly dawned upon the statesmen of that formative era that apportionment, while an imperatively essential reason for the census, to determine the geographical readjustment of political power in a government founded upon the democratic principle, was only one of many purposes this decennial stock-taking could be made to serve. With successive decades, new lines of enumeration were added,—agriculture in 1820, manufactures in 1840, other inquiries at following decades,—until the census became the periodical inventory of the national resources and the barometer of national development, in every phase and branch,—in human beings first, for the quality and character of its citizenship must always remain the most important national asset; after that the measurement and the differentiation of progress in every field where human energy finds play in the making of a nation. Thus the American census has become as essential, for definite knowledge of our national assets and liabilities, as the periodical book balancing of a business corporation in determining its solvency.

* Address read at the recent Scientific Congress of American Republics at Santiago, Chile.

So understood, the decennial census becomes the most important, useful, and productive undertaking of the federal government. As showing its relationship to the whole problem of modern government, the United States no sooner obtained a temporary responsibility in Cuba than it ordered a census, and the first step taken to re-establish civil government in the colonial possessions acquired by the war with Spain was the census of Porto Rico and the Philippine Islands.

To this day we remain the only nation in the world which has grasped the possibilities and the advantages of enumeration by the census method. Germany has followed our example in adding agricultural statistics to the population count, and, within a limited scope, industrial statistics as well. So have Belgium and Holland, and France to some extent. England, for the first time, is at this moment engaged in taking a census of her manufactures, modelled almost entirely upon the American plan. Other nations have similar enlargement of census work under legislative consideration. But it remains the fact that the United States has discovered the full possibilities of the census; and upon that fact rests the claim that the American census system is the model which the South American republics can best follow.

Many censuses had been taken before our first count in 1790, by many nations. The fundamental idea is as old as civilization itself. But that primitive census of 1790 was the first instance in history, so far as can be ascertained, in which the need for *periodical* enumerations at definitely fixed intervals was recognized and provided for.

Unless established on the basis of *regular recurrence*, the census accomplishes only one-half of its full purpose. All civilization is in a state of flux. The elements comprising it advance and recede in harmony with no known law, with varying momentum in different countries, and in the same countries at different periods. To know where a country stands, from time to time, with respect to itself and with respect to other countries, we must know the measure of these variations. Without this knowledge we cannot diagnose their causes. Hence periodical

enumeration is vital, wherever a national entity exists, if that nationality is to claim and maintain its proper place in the cosmos of nations. This has always been important. Before the twentieth century shall have reached its first quarter mile-post, it will be universally recognized as the most important economic and sociological knowledge that any nationality, be it big or little, can possess concerning itself.

England, Denmark, and Norway were quick to recognize the significance of the periodical enumeration, after the United States had set the example. In 1801 each of these countries followed the example of the youngest of the nations, and has followed it ever since. It seems curious to us, who have ten times in a century readjusted representation in Congress, that England, with a decennial enumeration by which to determine exact apportionment, still fails to accept the actual population, or some definitely determined group of population, as the basis for parliamentary representation.

But to England must be assigned one achievement, in census taking, unequalled in value and in magnitude,—an achievement which no other nation is likely to equal. She has ordained the decennial census, simultaneously with her own, in every colony and principality over which the British flag floats. And so we have had a census of Canada since 1825; of the Australian commonwealths from various dates, according to the degree of their development, beginning with New South Wales in 1821; and, most marvellous of all, since 1872, of the Empire of India, with its population of 250,000,000 people of hundreds of dialects and races. This latter is the most difficult and splendid achievement in census taking of which history makes record.

France took her first regular census in 1800, but not until 1831 did that nation provide for its periodical recurrence. In that year France established the quinquennial enumeration, and she has since enforced a five-year count of the people. Thus we may assign to France a service to the science of census taking only second to that of the United States and Great Britain. For the one certain thing is, in the increasing complications of human society and the increasing tendency of the

racers to shift and intermingle, that the five-year enumeration of the population will be demanded. Decennial enumerations are not frequent enough to meet the requirements of science, and particularly that branch which concerns the people more directly than any other,—vital statistics. It has come to be understood that among the first duties—perhaps the very first—of a government to the people whose welfare is in its keeping is their sanitary and hygienic protection; and this duty cannot be effectively performed without the intensive knowledge of the people which only a census affords.

The movement for five-year censuses is making steady headway in England, and will ultimately prevail. In our own country, Congress ought to encourage the several states to take the midway census of population, for which thirteen of these states already provide, by contributing a fair proportion of the cost.

In 1810 Prussia took a population census; and with the establishment of the German Empire, in 1871, began the periodical census of all the kingdoms and states comprised in the empire, along uniform lines, and this has since continued. Like France, Germany takes her census every five years; and Austria completes the roll of the nations which occupy this advanced ground. We shall come abreast with them when we realize that it is worth more than it costs.

I present, in the form of an appendix, a table showing the first and last censuses taken in each of the countries of Europe, Asia, and North and South America, and the population recorded at each. The table also indicates which censuses are periodical and which are irregular, and therefore desultory and of only temporary value. The table shows that populations aggregating 700 millions are periodically enumerated, and that other populations aggregating 300 millions have been enumerated once or twice, at irregular intervals. It permits an estimate, more or less uncertain, that the remaining unenumerated population of the globe is 700 millions.

Thus it appears that the census is spreading slowly around the world, and that 900 more millions of people have been definitely counted than was the case at the opening of the nineteenth century.

The countries of the globe have thus divided themselves into three groups,—those which take no census at all, those which take a census at irregular intervals, and those which take a census at five or ten year periods. I do not undertake to say that the degree of the effectiveness of its civilization is indicated by the group in which each country is located: that would be an arbitrary dictum which other facts will not support. But the nations which desire to be regarded, by a standard which will ultimately be accepted as quite exact, as ranking among the progressive nations, must ultimately align themselves in the last group. It is not without significance that the great nations that have taken no regular enumeration—meaning the nations which are great in territorial extent and aggregations of people—are China and Turkey, and that the great nation which has taken but one census is Russia.

Coming now to Central and South America, I submit a table which shows the dates at which the several republics have taken censuses, so far as I have been able to obtain them. The Bureau of American Republics has been of much assistance in the compilation of this table:

CENTRAL AMERICA.

<i>Country.</i>	<i>Dates at which censuses were taken.</i>
Costa Rica	1826, 1892, and 1907.
Guatemala	1880, bureau of statistics organized which issues an annual statement of the population, called <i>censo</i> .
Honduras	1881, 1887, and 1905.
Nicaragua	1895, 1906.
Salvador	1901, only census.
British Honduras	1870, 1881, 1891, and 1901.

SOUTH AMERICA.

Argentine Republic	1869, 1895, and 1905.
Bolivia	1831, 1835, 1845, 1854, 1882, and 1900.
Brazil	1872, 1890, and 1900.
Chile	1835, 1865, 1875, 1885, 1895, 1900, and 1905.
Colombia	1870, only census.
Ecuador	Only census ever taken that of city of Quito, May 1, 1906.
British Guiana	1850, 1871, 1881, and 1891.
Dutch Guiana	
French Guiana	
Paraguay	1873, 1887, and 1899.
Peru	1876, only census.
Uruguay	1852 and 1860. Bill now pending provides for a regular enumeration.
Venezuela	1873, 1881, 1891, and 1894.

Chile was the first of the South American republics to recognize the need for the periodical census, which she has periodically taken since 1865.

The Argentine Republic took a census in 1869, and then, after a lapse of sixteen years, began decennial enumerations in 1895, the third of which should follow in 1915. A growth of nearly 200 per cent. was revealed between the first and the last of these Argentine censuses. The landmarks from which to measure the marvellous development awaiting that garden spot of the southern hemisphere are definitely established. Brazil's first census was taken in 1872, and the second in 1890. The third, in 1900, revealed that the population had practically doubled in eighteen years. Nowhere in the world is the need for periodical enumerations more obvious and urgent than in these two empire republics of South America.

Ecuador and Dutch Guiana have never taken a census. Nicaragua and Salvador in Central America, and Colombia and Peru in South America, have taken but one census each, one republic in 1870, and the other in 1876,—more than thirty years ago.

Uruguay has taken no census since 1860, but a bill is now pending in her chambers to provide for periodical enumerations hereafter. Venezuela has taken four censuses, but at irregular intervals, 1894 being the last. Paraguay has taken three censuses, but at intervals so irregular that they furnish no definite basis by which to measure the rate of growth.

The facts last stated are not in keeping with the economic and industrial position which the continent of South America occupies to-day; and no subject before this Congress calls for more earnest consideration.

The republics of South America are upon the threshold of a new development, which is to parallel that which is taking place in the northern half of the hemisphere. While we are beginning to anticipate the exhaustion of our natural resources, those of our neighbors remain almost untouched and undiscovered. The time is approaching when the world will look to the South American republics for the food supplies and raw materials

which can no longer be spared from the mortgaged resources of North America. They are the Mecca of immigrants looking for new lands and new opportunities, under new conditions. The world wants to know about them; but, most of all, they need to know about themselves. The time has come when a general movement, looking to a simultaneous census, along uniform lines, in all the South American republics, should find voice and impulse; and the present Congress should supply them.

The most generally accepted dates for a decennial census are those that begin or end decades. The tenth year of the decade has been accepted in the United States and in several European countries, as well as in Brazil. England and most of her colonies accept the first year of the decade. Other countries, including the Argentine Republic and Chile, take the midway year of the decade. No date other than one of these three should ever be fixed for a national census. The ideal census situation would have every census in the world as of the same year. More and more, censuses are being availed of for international comparisons. Their ultimate function is to reveal conditions in each country, in exact comparison with the similar conditions in every other. It is through this agency that progress in every civilized state will ultimately be measured. A uniform date for the world's censuses would be of incalculable service to the science of sociology,—a science which could not effectively accomplish its great mission without the aid of the census. This is an ideal situation, of which we may dream, but which can never be realized. The nations which have been measuring their advance by given periods from given dates will never disjoint their records to conform to this ideal world standard.

But there are cogent reasons why the census of all the South American states should be taken as of the same date. They are consanguineous states; they are moving shoulder to shoulder towards the same destiny; they can learn more from each other, in certain directions, than from any one else. It is not too late, if an earnest effort is made, to agree upon a uniform date for every South American census.

There are also reasons, cogent again, why it will be of the utmost advantage if the South American states can accept the census date of the United States, which is also the date accepted by the republic of Mexico, lying midway between us, and advancing with splendid energy along the same pathways.

Even more important is it, however, that the censuses of all nations, and particularly of all American nations, shall be taken upon schedules so substantially alike in their interrogatories as to permit of exact comparison of data. Half the value of a census is wantonly wasted unless it is so planned that there can be read out of it not only the facts that concern the nation taking it, but the meaning of those facts when interpreted by the experience of others. Theoretically, this is so easily done that you would suppose it would be universally done. As a matter of fact, the science of census taking is still so young that international uniformity in schedules does not yet exist. The International Statistical Institute has rendered much admirable service in the co-ordination of census inquiries, but it has fallen short of its opportunities in this the greatest field of its endeavor.

A uniform schedule for every South American census is only less important than that there shall be a periodical census in every South American state. It can be insured, if the proper stress is laid upon its importance, in any movement that may be undertaken along the lines urged in this paper.

In suggesting the population schedule of the United States census as the best available model for a census of all the South American states, I have in mind primarily the fact that our experiences, in the evolution of citizenship, have been and are likely to continue to be increasingly similar. The population of the northern portion of the hemisphere is an amalgam, composed of elements drawn from many nationalities, diverse in the characteristics which mark off one race from another. These racial characteristics have been blended and combined in the strenuous mixture of our national life, so that there has been created a new race, unknown elsewhere, and already recognized as essentially North American. This marvellously

interesting commingling of peoples and intermixture of traits is steadily progressing in the states. The evolution of the new North American is always in gestation: the ultimate type, as he is to leave his impress upon history, is still to appear.

The United States census schedule is so framed as to record the various component parts which go to make up this new race, and to measure, so far as it is possible to do so, the proportion of each of the elements in the composite, and in accordance with the contribution of each decade to that composite.

Note now the similar conditions which are developing in the South American republics. Your states, like the United States, are too vast in fertile area to be peopled from within. You must draw, and increasingly, as we are doing, from all the countries whose overflowing populations are seeking what you have to offer in inexhaustible abundance. While the Spanish type will remain the basis of the South American race of the future, as the Anglo-Saxon remains the foundation of the citizenship of the United States, it will be modified, as with us; and out of the censuses which record the successive steps of this modification the future historian will extract the true explanation of the new civilization you are now preparing to contribute towards the world advancement.

This is the chief of many reasons why the United States schedule is best adapted to the South American states. It is a schedule a century old in its evolution. It has been tested under all conditions of human existence. It has been modified cautiously, as experience has pointed the way to more exact and definite results. It will stand, substantially without change, at the Thirteenth Census in 1910. It is adapted to the purposes and the situation of kindred peoples, who trace their origin to similar conditions, who grapple with like difficulties, who are advancing with strides more rapid than the European nations can comprehend, towards a common destiny.

Uniformity and co-operation in the census methods of the republics of the American continent is not only feasible at every point and in every particular, but it is most important in its bearing upon the future relations of all the republics concerned,

as well as to their mutual knowledge and understanding of each other. Each republic will gain from this co-operation with every other, and the weakest will gain the most in proportion.

The United States, with a longer experience than any other nation in decennial census taking, tenders its good wishes and its cordial assistance to each and every South and Central American republic which may feel the need of its co-operation in this great field. Every facility which the permanent Census Office has acquired will be placed at the service of any state which may seek it, and every chapter in our century of experience which may help to minimize the inexperience of others will be spread open and explained.

General Francis A. Walker, who was the superintendent of the Tenth and the Eleventh Censuses of the United States, and who was the greatest census taker the world has yet produced, once remarked that "the people of the United States are well able to pay for the very best census they can get"; and the people have proved each decade that he was right. If I may be permitted to paraphrase his remark, I will conclude by saying that the people of no South American country can afford *not* to pay for the very best census they can get, periodically taken, at least once every ten years, covering as many lines of national activity as possible, and taken in accordance with a uniform plan.

POPULATION OF THE WORLD.

USING LATEST ESTIMATES, AND, WHERE NO ESTIMATES ARE AVAILABLE, THE LATEST CENSUS RETURNS.

North America	114,238,303
Central America	4,741,301
South America	42,633,846
Europe	427,410,531
Asia	893,401,460
Africa	140,656,540
Australia and Oceania	49,906,550
Total	1,672,987,531

APPENDIX A.

Country.	Date of Census.		Population.		Latest Estimate.	
	First.	Last.	First.	Last.	Date.	Population.
Totals			555,247,959	957,388,235	—	1,134,065,703
North America			16,296,386	101,539,495	—	90,865,255
United States	1790	1900	3,929,214	76,303,387	1908	87,189,392
Greenland	1868	1901	9,352	11,893	—	—
Newfoundland and Labrador	1857	1901	124,288	220,984	1906	232,778
Canada	1825	1906	581,920	6,504,900	—	—
Mexico	¹ 1875	1900	9,495,157	13,605,919	—	—
West Indies:						
Cuba	1774	1907	172,620	2,048,980	—	—
Porto Rico	1887	1899	807,708	953,243	—	—
Haiti	—	—	—	—	1906	1,916,000
Santo Domingo	—	—	—	—	—	—
Bahamas	1861	1901	35,287	53,735	1906	59,142
Barbados	1851	1891	135,939	182,867	1905	199,542
Jamaica	1844	1891	377,433	639,491	1907	490,835
Leeward Islands	1861	1901	109,419	127,434	1906	98,355
Trinidad and Tobago	1851	1901	83,981	² 273,899	1905	331,800
Windward Islands	1861	1901	31,900	³ 160,869	1906	175,587
Bermudas	1861	1901	11,450	⁴ 20,961	—	—
Danish West Indies	1860	1901	37,137	30,527	—	—
Martinique	1894	1901	187,692	203,781	1905	182,024
St. Pierre and Miquelon	—	1901	—	6,352	—	—
Guadeloupe and dependencies	1889	1906	165,889	190,273	—	—
Central America	—	—	1,999,372	4,069,979	—	2,283,141
British Honduras	1861	1901	25,635	37,479	1906	41,007
Guatemala	1880	1900	1,224,602	1,574,340	1903	1,842,134
Honduras	1881	1905	307,289	500,136	—	—
Salvador	—	⁴ 1901	—	1,006,848	—	—
Nicaragua	1895	1906	380,000	600,000	—	—
Costa Rica	1826	1907	61,846	351,176	—	—
Panama	—	—	—	—	1907	400,000
South America			16,094,673	37,536,564		13,924,727
Colombia	—	⁴ 1870	—	2,951,323	1905	4,379,674
Venezuela	1873	1894	1,784,194	2,444,816	1906	2,619,218
Guiana, British	1850	1891	127,695	278,328	1906	306,959
Guiana, Dutch	—	—	—	—	1905	75,465
Guiana, French	1881	1901	27,035	32,910	—	—
Brasil	1872	1900	9,931,000	17,371,069	—	—
Ecuador (only census ever taken that of city of Quito)	—	—	—	—	1906	1,400,000
Peru	—	⁴ 1876	—	2,699,106	1896	4,609,999
Bolivia	1831	1900	1,088,768	1,633,610	—	—
Argentine Republic	1869	1905	1,737,076	5,106,378	—	—
Chile	⁴ 1835	1905	1,010,332	3,399,928	—	—
Paraguay	⁴ 1873	1899	231,079	⁷ 533,299	1905	631,347
Uruguay	1852	1908	131,969	1,030,078	—	—
Curacao (colony)	1874	1905	23,972	53,466	—	—
Falkland Islands	1881	1901	1,553	2,253	1906	2,065

¹ A census of Mexico was taken in 1810 by Dr. Fernando Navarro y Noriega, at which population was reported as 6,122,354.

² First census 1831, not completed until 1835.

³ Including military and naval.

⁴ A count by the Jesuits was made in 1740.

⁵ Including St. Vincent, estimated at 47,548.

⁷ Excluding Indians estimated at 50,000.

⁶ Only census ever taken.

APPENDIX A.—Continued.

Country.	Date of Census.		Population.		Latest Estimate.	
	First.	Last.	First.	Last.	Date.	Population.
Europe			240,380,224	392,502,789		269,837,147
England and Wales	1801	1901	8,892,536	32,527,843	1907	44,100,231
Isle of Man	1821	1901	¹ 89,508	54,752		
Channel Islands	—	1901	—	95,618		
Ireland	1801	1901	5,216,329	4,458,775		
Scotland	1801	1901	1,608,420	4,472,103		
² Army and navy and seamen abroad.	1801	1901	442,013	367,736		
³ Malta	1860	1901	139,842	⁴ 207,890		
Gibraltar	⁵ 1871	1901	18,695	27,460	1905	⁶ 18,645
Norway	⁷ 1801	1900	883,440	2,240,032	1906	2,321,088
Sweden	1749	1900	1,746,449	5,136,441	1906	5,337,055
⁸ Portugal	1864	1901	4,188,410	5,423,132	1904	5,556,814
Spain	⁹ 1857	1900	15,464,340	¹⁰ 18,831,574	1905	19,565,903
France	1800	1906	27,349,008	39,252,245	—	—
Belgium	1846	1900	4,337,196	6,693,810	1906	7,238,622
The Netherlands	1829	1899	2,613,487	5,104,137	1906	5,672,237
Switzerland	1837	1900	2,190,258	3,315,443	1905	3,463,609
Italy, including Sicily and Sardinia.	1861	1901	21,777,324	32,475,253	1907	33,640,710
Denmark	¹¹ 1801	1906	925,680	2,588,919	—	—
¹² Iceland	1801	1901	47,240	78,470	—	—
¹³ Faroe Island	1801	1906	5,265	16,349	—	—
German Empire	1871	1905	41,062,697	60,641,278	—	—
Austria-Hungary	1850	1900	30,726,503	45,405,267	—	—
Greece	1832	1907	712,608	2,631,952	—	—
Turkey in Europe	—	—	—	—	1907	6,130,200
Bosnia and Herzegovina	1879	1895	1,158,440	1,568,092	1907	1,600,000
Bulgaria	1881	1905	2,007,919	4,085,648	—	—
Cyprus	—	1901	—	237,152	1905	248,114
Crete	—	1900	—	310,185	1907	310,300
Samos	—	—	—	—	1902	53,400
Montenegro	—	—	—	—	1907	230,000
Monaco	1890	1900	13,304	15,180	—	—
Andorra	—	—	—	—	1907	5,230
Luxemburg (Grand Duchy)	1867	1900	199,958	236,543	1905	246,455
San Marino	—	1906	—	11,439	—	—
Serbia	1834	1905	678,187	2,688,747	—	—
Rumania	1844	1899	3,578,000	5,956,690	1907	6,585,534
¹⁴ Russia in Europe	¹⁵ 1851	1897	62,307,213	105,396,634	1906	127,513,000

¹ Including Channel Islands.² Also included in the returns for countries where stationed.³ Including Goso and Comino.⁴ Including military and naval and merchant shipping.⁵ A count of population in 1860 gave 18,491.⁶ Excluding military and naval, etc.⁷ A count made in 1769 gave population as 723,141.⁸ Including Azores and Madeira.⁹ A count made in 1594 gave population as 8,206,791.¹⁰ Legal population.¹¹ A count made in 1769 gave population as 814,238, and one in 1787 gave 840,045.¹² A count made in 1769 gave population as 46,201.¹³ A count made in 1769 gave population as 4,773.¹⁴ Including Finland.¹⁵ Before 1897 there were various enumerations called revisions. In 1897 the whole of the empire was enumerated.

APPENDIX A.—Continued.

Country.	Date of Census.		Population.		Latest Estimate.	
	First.	Last.	First.	Last.	Date.	Population.
Asia			274,834,842	376,003,682		594,564,749
Russia in Asia	—	1897	—	22,758,203	1908	26,140,200
Japan, including Formosa and the Pescadores	1875	1903	32,794,897	46,584,414	1904	50,131,414
Korea	—	—	—	—	1907	10,000,000
Chinese Empire	—	—	—	—	1908	438,214,000
India (Native States)	1872	1901	48,267,910	62,461,549	—	—
British India	1872	1901	190,563,048	231,899,507	—	—
North Borneo	—	1901	—	104,527	1907	160,000
¹ Ceylon	1871	1901	2,405,287	3,573,419	—	—
Hong Kong	1857	1906	77,094	¹ 328,638	—	—
Wei-Hai-Wei	—	1901	—	130,792	1907	150,000
The Straits Settlements	1871	1901	308,097	¹ 573,598	—	—
Federated Malay States	1891	1901	418,509	678,595	1906	915,000
State of Johor	—	—	—	—	1907	200,000
French Indo-China:						
French India	—	1901	—	273,185	1907	275,400
Annam	—	—	—	—	1907	6,124,000
² Cambodia	—	—	—	—	1907	1,500,000
Cochin-China	—	—	—	—	1907	2,968,600
Tonkin and Laos	—	—	—	—	1907	10,650,000
Afghanistan	—	—	—	—	1907	4,500,000
Turkey in Asia	—	—	—	—	1907	17,683,500
Persia	—	—	—	—	1907	9,500,000
Bhutan	—	—	—	—	1864	20,000
Oman	—	—	—	—	1907	800,000
Nepal	—	—	—	—	1907	5,000,000
Bokhara	—	—	—	—	1907	1,250,000
Khiva	—	—	—	—	1907	800,000
Siam	—	1904	—	³ 3,308,032	1907	6,688,846
Portuguese possessions	—	1901	—	329,223	1907	895,789
Africa			1,497,467	33,074,539		123,814,713
French colonies and dependencies	—	—	—	—	1907	34,092,300
British colonies and dependencies:						
Ascension Island	1891	1901	205	410	—	—
Basutoland	1891	1904	218,324	348,848	—	—
Bechuanaland Protectorate	—	1904	—	⁴ 120,776	1907	200,000
Cape of Good Hope	⁵ 1865	1904	496,381	2,409,804	—	—
East Africa Protectorate	—	—	—	—	1907	4,000,000
Uganda Protectorate	—	—	—	—	1907	4,000,000
Zanzibar and Pemba	—	—	—	—	1907	245,000
Mauritius and dependencies	1851	1901	184,696	378,195	1905	⁶ 382,972
¹ Natal, including Zululand	—	1904	—	1,108,754	1906	1,151,907
Nyasaland Protectorate	—	—	—	—	1907	927,355
¹ Orange River Colony	1880	1904	133,518	387,315	—	—
Rhodesia	—	1907	—	⁴ 999,636	1907	803,300
St. Helena	1839	1906	4,205	8,526	—	—
Seychelles	1851	1901	6,811	19,258	1905	20,767

¹ Including military and naval.² Not including provinces ceded by Siam in 1907.³ Census of 1904 was for twelve Monthons or provincial circles only, the metropolitan Monthon of Bangkok being among those not enumerated.⁴ Partly estimated.⁵ First census taken under Act of 1862. A count made in 1691 gave population as 1706.⁶ Excluding military and naval.

APPENDIX A.—Continued.

Country.	Date of Census.		Population.		Latest Estimate.	
	First.	Last.	First.	Last.	Date.	Population.
<i>Africa.—Continued.</i>						
British colonies and dependencies.—						
<i>Continued.</i>						
Somaliland Protectorate	—	—	—	—	1906	300,029
The Transvaal	—	1904	—	¹ 1,354,200	—	—
Nigeria	—	1901	—	² 13,606,093	1906	14,782,183
Sierra Leone	1857	1901	38,318	² 1,026,482	—	—
Gambia, Colony and Protectorate,	1851	1901	6,939	90,404	—	—
Gold Coast	1871	1901	408,070	² 1,486,433	—	—
German colonies in Africa	—	—	—	—	1907	11,700,000
Italian dependencies in Africa	—	—	—	—	1907	450,000
Portuguese dependencies	—	—	—	—	1907	8,248,500
Turkey in Africa	—	—	—	—	1907	1,000,000
Egypt	—	1897	—	9,784,405	—	—
Spanish possessions	—	—	—	—	1907	10,400
Congo Free State	—	—	—	—	1907	30,000,000
Abyssinia	—	—	—	—	1907	10,000,000
Liberia	—	—	—	—	1907	1,500,000
<i>Australia and Oceania</i>			4,144,905	12,661,187		38,775,971
Victoria	1854	1901	⁴ 234,298	1,201,341	—	—
New South Wales	1821	1901	29,662	1,359,133	1906	1,526,097
Southern Australia	1844	1901	⁴ 17,366	389,727	—	—
Western Australia	1848	1901	⁴ 4,622	189,385	—	—
Queensland	1861	1901	⁴ 30,059	⁵ 503,266	—	—
New Zealand	1858	1906	59,413	⁶ 986,309	—	—
Tasmania	1841	1901	⁴ 50,216	172,475	1903	177,547
Fiji Islands and Rotuma	1881	1901	127,486	120,124	—	—
Tonga Islands	—	—	—	—	1907	20,677
British New Guinea	—	—	—	—	1907	350,000
Other British Islands	—	—	—	—	1907	176,800
New Caledonia and dependencies	—	—	—	—	1907	53,350
Other French establishments in	—	—	—	—	—	—
Oceania	—	—	—	—	1907	29,000
Samoa Islands (United States)	—	—	—	—	1907	6,100
East Indies, Dutch	—	—	—	—	1907	36,000,000
Philippine Islands	1877	1903	3,567,685	7,635,426	—	—
Guam	—	—	—	—	1907	9,000
German dependencies in the Pacific	—	—	—	—	1907	427,000
Hawaii	1853	1900	24,188	154,001	—	—

¹ Including military and naval.² Partly estimated. British Statistical Abstract, 1906.³ Partly estimated. Census British Empire, 1901.⁴ Excluding aborigines.⁵ Excluding aborigines, estimated at 20,000.⁶ Including Cook and other islands.

OCCUPATION MORTALITY STATISTICS OF SHEFFIELD, ENGLAND, 1890-1907.

BY F. S. CRUM.

The annual reports of the Medical Officer of Health of Sheffield, England, have long been of special interest and value because they have contained occupation mortality data. This fact in itself is sufficient to mark the reports as being unique, for mortality by occupation is very rarely included in the health reports of England or any other country. Sheffield being an important centre for the manufacture of cutlery and files, many men are employed there as cutlers, grinders, tool-makers, file-makers, etc., and the occupation statistics are of special value because they throw considerable light upon certain trades which are health-injurious.

The present report, like those for many previous years, contains the tabulated mortality returns for all of the important occupations. The industries of special importance, however, are those already specifically mentioned. The following table found on page xi of the report for 1907 will indicate in a rough way the effect of certain occupations on mortality, and particularly their effect on the mortality from certain causes of death:—

AVERAGE MORTALITY IN SHEFFIELD FROM ALL CAUSES AND FROM
PHTHISIS AND DISEASES OF THE RESPIRATORY ORGANS DURING
THE THREE YEARS, 1905, 1906, AND 1907, IN CERTAIN DUSTY TRADES,
AND AMONG ALL MALES OVER TWENTY YEARS OF AGE.

Trade.	Males over 20 Years of Age. (Estimated Population.)	Average Death-rates per 1,000 Living.		
		All Causes.	Phthisis.	Respiratory Diseases.
Grinders	3,375	34.2	16.3	5.7
Cutlers	2,500	40.8	7.2	8.4
File-cutters	1,850	32.1	4.5	5.4
Silver, etc., Workers . . .	2,380	26.9	5.5	4.9
All Males	127,000	16.2	2.6	2.1

This table would have been more useful if it had been given by divisional periods of life, but even in its present form it is suggestive of the baneful effect on health of certain trades which expose the workmen to mineral and metallic dust. The mortality rate from all causes is shown to have been more than double the expected rate for grinders and cutlers, and excessive for file-cutters and other metal-goods workers. The mortality from phthisis was more than six times as high for grinders as for all males, and very much in excess also among the other metal workers. The mortality from respiratory diseases was four times as high for cutlers as for all occupied males, and considerably in excess among other metal workers.

Unfortunately, the number of persons employed in the various trades peculiar to Sheffield are not available by divisional periods of life, and it is therefore impossible to calculate death-rates by age groups. The mortality returns, however, are given by age groups and by principal causes of death, and a study of these statistics can be made in such a manner as to show the proportion which certain causes of death bear to the mortality from all causes at various divisional periods of life. This method, when used in a comparative way, is very suggestive and perhaps quite as determining for certain purposes as death-rates per 1,000 living.

In the following tables a summary is presented of the statistics of four typical trades—grinders, cutlers, tool-makers, and file-cutters—for the eighteen-year period 1890–1907, for the purpose of showing whether or not there has been any improvement in the mortality from phthisis and respiratory diseases of the workmen in the trades specified:—

I. PROPORTIONATE MORTALITY OF *CHILDREN* FROM PHTHISIS AND RESPIRATORY DISEASES IN SHEFFIELD, 1890-1907.

Ages.	Number of Deaths from					Percentage of Mortality from Phthisis.		
	All Causes.		Phthisis.					
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901. 1902-07.
Under 25	34	23	22	14	8	12	41.2	34.8 54.5
25-34	88	69	86	43	29	61	48.9	42.0 70.9
35-44	137	142	143	72	80	93	52.6	56.3 65.0
45-54	201	183	199	78	82	106	38.8	44.8 56.1
55-64	130	163	162	31	45	66	23.8	27.6 40.7
65 and over	90	80	107	8	7	14	8.9	8.8 13.1

Ages.	Number of Deaths from					Percentage of Mortality from		
	Respiratory Diseases.		Phthisis and Respiratory Diseases.					
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901. 1902-07.
Under 25	10	5	4	29.4	21.7	18.2	70.6	56.5 73.7
25-34	22	13	7	25.0	18.8	8.1	73.9	60.9 79.1
35-44	27	29	15	19.7	20.4	10.5	72.3	76.8 76.5
45-54	70	47	32	34.8	25.7	16.9	73.6	70.5 73.0
55-64	61	61	43	46.9	37.4	26.5	70.8	65.0 67.3
65 and over	39	29	25	43.3	36.3	23.4	52.2	45.0 36.4

II. PROPORTIONATE MORTALITY OF *OUTLERS** FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890-1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.			
	All Causes.			Phthisis.						
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	
Under 25	52	36	22	26	16	9	50.0	44.4	40.9	
25-34	62	49	40	30	27	20	48.4	55.1	50.0	
35-44	145	85	74	52	32	30	35.9	37.6	40.5	
45-54	141	146	120	22	39	31	15.6	26.7	25.8	
55-64	193	183	154	21	22	22	10.9	12.0	14.7	
65 and over	327	204	226	3	8	10	0.9	3.9	4.4	

Ages.	Number of Deaths from Respiratory Diseases.						Percentage of Mortality from Respiratory Diseases.			
	Respiratory Diseases.			Respiratory Diseases.						
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	
Under 25	8	11	6	15.4	30.6	27.3	65.4	75.0	68.2	
25-34	12	4	9	19.4	8.2	22.5	67.7	63.3	72.5	
35-44	37	20	9	25.5	23.5	12.2	61.4	61.2	52.7	
45-54	54	39	27	38.3	26.7	22.5	53.9	53.4	48.3	
55-64	82	46	35	42.5	26.2	22.7	53.4	38.3	37.0	
65 and over	117	50	58	35.8	24.5	25.7	36.7	28.4	30.1	

* "The term *outlier* has not, in Sheffield, the meaning popularly given it; that of a maker of scissors, forks, rasors, and other small cutting utensils. Such a one is a *dry grinder*; whereas a *cutler* is one who makes heavier goods, edge-tools, saws and sythes, all of which are *wet ground*." (Arldge, "Diseases of Occupation," p. 341.)

"The baseful tendency of the trade [grinding] is not confined to dry grinding; the position in which the artisans work is exceedingly unfavorable to the action of the lungs, the upper half of the body being constantly bent forward over the revolving stone; and in the branches in which dry grinding is not used, the articles, such as saws, sythes and edge tools, are heavy, demanding great muscular exertion. Independently, however, of the bodily exhaustion which is occasioned, the grinders are exceedingly subject to acute inflammatory diseases from the exposed situations in which they work." (Holland, "The Vital Statistics of Sheffield," p. 115.)

III. PROPORTIONATE MORTALITY OF *TOOL-MAKERS* FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890-1907.

Age.	Number of Deaths from						Percentage of Mortality from Phthisis.			
	All Causes.			Phthisis.						
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1902-07.
Under 25	22	31	27	12	12	7	54.5	38.7		25.9
25-34	38	52	61	16	20	30	42.1	38.5		49.2
35-44	65	70	85	26	26	32	40.0	37.1		37.6
45-54	104	126	135	18	26	36	17.3	20.6		26.7
55-64	134	152	182	14	19	30	10.4	12.5		16.5
65 and over	180	246	333	5	2	8	2.8	0.8		2.4

Age.	Number of Deaths from Respiratory Diseases.				Percentage of Mortality from			
	Respiratory Diseases.				Phthisis and Respiratory Diseases.			
	1890-95.	1896-1901.	1902-07.		1890-95.	1896-1901.	1902-07.	
Under 25	5	5	4	23.7	77.3	54.5	40.7	
25-34	3	10	7	7.9	50.0	57.7	60.7	
35-44	15	7	15	23.1	63.1	47.1	55.3	
45-54	41	35	25	39.4	56.7	48.4	45.2	
55-64	53	33	50	39.6	50.0	37.5	44.0	
65 and over	67	58	90	37.2	40.0	24.4	29.4	

IV. PROPORTIONATE MORTALITY OF *FILE-CUTTERS** FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890-1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.			
	All Causes.			Phthisis.						
	1890-95.		1896-1901.		1902-07.		1890-95.	1896-1901.	1902-07.	
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	
Under 25	24	29	18	8	5	10	33.3	17.2	55.6	
25-34	49	39	20	17	17	4	35.4	43.6	20.0	
35-44	115	73	68	28	25	22	24.3	34.2	32.4	
45-54	182	118	96	30	23	21	19.7	19.5	21.9	
55-64	116	133	112	16	13	9	5.2	9.8	8.0	
65 and over	119	106	121	2	4	4	1.7	3.8	3.3	

Ages.	Number of Deaths from Respiratory Diseases.						Percentage of Mortality from Phthisis and Respiratory Diseases.			
	Respiratory Diseases.			Respiratory Diseases.						
	1890-95.		1896-1901.		1902-07.		1890-95.	1896-1901.	1902-07.	
	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	1890-95.	1896-1901.	1902-07.	
Under 25	6	8	1	25.0	24.1	5.5	58.3	41.3	61.1	
25-34	7	6	3	14.6	15.4	15.0	50.0	59.0	35.0	
35-44	24	4	13	20.9	5.5	19.1	45.2	39.7	51.5	
45-54	36	21	9	23.7	17.8	9.4	43.4	37.3	31.3	
55-64	36	28	16	31.0	21.1	14.3	36.2	30.9	22.3	
65 and over	43	23	32	36.1	21.7	26.4	37.8	25.5	29.7	

* File-cutting as carried on in Sheffield in the past by hand methods has exposed the cutters to lead poisoning, or plumbism, to such a degree that this factor alone has called forth many and extended comments by qualified inquirers. These observations have extended over a long period, and have been made by various English authorities, including Drs. Holland, Greenhow, Hall, White, Thomson, Arlidge, Littlejohn, Robertson, Saunfield, Oliver, and others. The subject of lead poisoning in this connection is such a large one that it will be worth while to give it special consideration in a future note.

The figures in Table I. do not indicate that there has been any marked improvement in the mortality from consumption and respiratory diseases among the *grinders* of Sheffield during the period 1890 to 1907. In fact, as a rule with few exceptions, the proportionate mortality from consumption and from consumption and respiratory diseases combined was higher at all ages during the six years 1902-07 than during either of the other six-year periods. On the other hand, the mortality from respiratory diseases, when considered separately, seems to have declined fairly constantly at all ages or divisional periods of life.

Table II. shows that the proportion of the total mortality due to consumption has increased among the *cutlers* of Sheffield at all ages over 25. The proportionate mortality from respiratory diseases has increased at ages under 35 and decreased quite considerably at ages 35 and over. Combining the mortality from consumption and respiratory diseases, the proportionate mortality from the two was higher during the period 1902-07 than during 1890-95 at ages under 35 and lower at ages 35 and over.

The proportionate mortality of *tool-makers* from consumption and respiratory diseases has, on the whole, showed improvement during the eighteen-year period under observation. The age period 25-34 is the only exception when both causes are combined. When consumption only is considered, the improvement was more noteworthy during the period 1896-1901 than during 1902-07. In fact, the proportionate mortality from consumption was lower among tool-makers during 1902-07 than during 1890-95 at ages under 25, 35-44, and 65 and over, and higher at ages 25-34, 45-54, and 55-64.

The proportionate mortality of *file-cutters* has not improved from consumption, but was higher at all ages, except 25-34, during 1902-07 than during 1890-95. On the other hand, there was a quite general improvement in the proportionate mortality from respiratory diseases.

Summarizing the four preceding tables they seem to indicate that, if there has been an improvement in the death-rate from

all causes among grinders, cutlers, tool-makers, and file-cutters in Sheffield during 1890-1907, the improvement has not been due to any considerable reduction in the mortality from consumption, or, at any rate, the mortality from consumption has not declined in proportion to all causes, for, as a rule, the proportionate mortality from consumption was higher during 1902-07 than during 1890-95. The apparent general improvement in the mortality from respiratory diseases is quite noticeable in all the tables, and it is possible that in recent years deaths may have been reported as phthisis that would formerly have been reported as bronchitis or some other respiratory disease.

In the following table, comparison is made of the proportionate mortality of grinders, cutlers, tool-makers, and file-cutters from consumption and respiratory diseases. To clearly indicate the excessive mortality in these Sheffield trades from diseases of the lungs and air passages, the corresponding proportionate mortality for all occupied males in England and Wales as reported in the Supplement to the Sixty-fifth Report of the Registrar-General is given in the last column.

COMPARATIVE PROPORTIONATE MORTALITY, SHEFFIELD,
ENGLAND, 1902-07.

PHTHISIS.

Ages.	Grinders.	Cutlers.	Tool-makers.	File-cutters.	All Occupied Males, England and Wales, 1900-02.
Under 25 . .	54.5	40.9	25.9	55.6	30.5
25-34 . . .	70.9	50.0	49.2	20.0	33.8
35-44 . . .	65.0	40.5	37.6	32.4	26.9
45-54 . . .	56.1	25.8	26.7	21.9	17.1
55-64 . . .	40.7	14.7	16.5	8.0	7.0
65 and over .	13.1	4.4	2.4	3.3	1.2

RESPIRATORY DISEASES.

Ages.	Grinders.	Cutlers.	Tool-makers.	File-cutters.	All Occupied Males, England and Wales, 1900-02.
Under 25 . .	18.2	27.3	14.8	5.5	10.5
25-34 . . .	8.1	22.5	11.5	15.0	12.8
35-44 . . .	10.5	12.2	17.6	19.1	16.3
45-54 . . .	16.9	22.5	18.5	9.4	18.7
55-64 . . .	26.5	22.7	27.5	14.3	21.1
65 and over .	23.4	25.7	27.0	26.4	20.1

**COMPARATIVE PROPORTIONATE MORTALITY, SHEFFIELD,
ENGLAND, 1902-07.**

PHTHISIS AND RESPIRATORY DISEASES.

Ages.	Grinders.	Cutlers.	Tool-makers.	File-cutters.	All Occupied Males, England and Wales, 1900-02.
Under 25 . .	72.7	68.2	40.7	61.1	41.0
25-34 . . .	79.1	72.5	60.7	35.0	46.6
35-44 . . .	75.5	52.7	55.3	51.5	43.2
45-54 . . .	73.0	48.3	45.2	31.3	35.8
55-64 . . .	67.3	37.0	44.0	22.3	28.1
65 and over .	36.4	30.1	29.4	29.7	21.3

This table requires little comment. It shows that persons employed as grinders, cutlers, tool-makers, and file-cutters, are considerably more liable to death from some disease due to, or accelerated by, dust inhalation than would be expected on the basis of the mortality of all occupied males in England and Wales. The statistics point unmistakably to the causes of the high mortality of these classes or groups of workmen, and they indicate the need of greater precautions and more effective safeguards against the inhalation of the metallic and mineral dusts peculiar to the trades specified.

In conclusion I may again* point out that there are many cities and towns in the United States where one or more industries, more or less hazardous or health-injurious, are centralized. For example: Trenton and Perth Amboy, N.J., and Circleville, Ohio, are pottery centres; Orange, N.J., and Danbury, Conn., are felt-hat making centres; Barre, Vt., among other cities, is a centre for stone-cutting; White Mills, Pa., and Corning, N.Y., for glass-cutting; Amsterdam, Cohoes, and Middletown, N.Y., for the knitting industry; Philadelphia, Pa., for carpet mills; Fall River and New Bedford, Mass., for cotton and woollen textiles; Paterson, N.J., for silk goods; Pittsburg, Pa., for iron and steel products; Minneapolis, Minn., for the flour industry, and Key West, Fla., for the manufacture of cigars and cigarettes. If the local authorities in such cities and towns would

* "The Mortality from Consumption in Small Cities," Quarterly Publications of the American Statistical Association, December, 1907.

evinced a willingness and enthusiasm to contribute to the general fund of knowledge of trade diseases and mortality, they would not only perform a really valuable service to their fellow men, but they would at the same time connect their names with investigations similar to those which have contributed greatly to the fame of Ramazzini, Thackrah, Hirt, Farr, Arlidge, Oliver, and some others of the select few who have found time to give to the world the results of their inquiries into the effect of certain industries or trades upon the disease liability and mortality of those employed therein. Few, indeed, are the contributions which have been made along these lines by qualified American authorities. It may very properly be said that here is a field where the harvest is full and ripe, but the reapers few.

STANDARDIZATION OF HOUSING INVESTIGATIONS.

BY JOHN R. COMMONS, PROFESSOR OF POLITICAL ECONOMY,
UNIVERSITY OF WISCONSIN.

I had read that Glasgow was the most densely crowded of modern cities, because fourteen per cent. of the families lived in one room. After visiting one of the model tenements of the London County Council, I was asked by a Glasgow mechanic to look into his ancient rookery. The one room in which he and his family lived seemed to me to be larger than the three-room apartment of his fellow who enjoyed the municipal socialism of modern London. The difference was that he put up his own flimsy partitions, while paternal London got the credit of relieving congestion by merely erecting permanent partitions.

In Pittsburg I was told by experts in housing investigations that the cost of housing there was greater than in any other city of the country, but when I compared the few houses that I saw with similar houses in Chicago, taking into account appurtenances, I could not see that the costs were different.

British workmen and employers contended that their lower wages were compensated by the lower cost of food as well as housing, compared with American wages, and I could not refer them to any authentic standards of food and prices, housing and rents, that would disprove their claims to their satisfaction.

If comparisons of this kind were a matter of profit and loss, standard units would long since have been devised. Such units have been worked out by the trusts, syndicates, and engineering societies, in order to bring all of their manufacturing plants, their superintendents, managers, and engineers, their inventions and experiments, to an exact comparison of efficiency based on unit costs.

There is one department of sociology which eventually will make it plain that standard units of housing, food, and occupation, are also a matter of profit and loss. This is the health, vigor, and efficiency of the working population. The trade longevity of the workman, the number of days lost through sickness, fatigue, and devitalizing, the rate of mortality, are the greatest of all matters of national business, and they are largely the results of housing, food, and occupation.

But, to what extent these different factors enter, it is impossible to say until standard units are devised by which to compare each factor with the resulting morbidity, mortality, and fatigue.

Here the problem of the economist and that of the hygienist overlap. The economist is interested in comparative cost of living, the hygienist in comparative causes of industrial efficiency. But the cost of living is really the cost of the workman's efficiency. If so, the unit of comparison which the economist wants is the same unit that the hygienist wants. Take housing as the simplest problem. The comparative cost of housing is the comparative price paid for a unit of housing accommodation. But housing accommodation is not merely floor space or "rooms per occupant": it is also location, air, ventilation, sunlight, structural condition, bath, laundry, running water, etc. These are also the conditions of health. The cost of housing is one of the costs of industrial vigor. If, then, we devise our standard unit with reference to the conditions of health, we shall have practically the standard needed for comparing prices of housing accommodation.

But the unit of housing accommodation is a complicated and elusive one. It consists of many factors, and no two individual investigators attach the same weight to each of the factors. The problem here is exactly the same as that which has been met in standardizing and grading agricultural products, such as wheat, corn, oats, butter, cheese, horses, cows, pigs, and so on. To illustrate by means of the score card used in the department of Animal Husbandry of the University of Wisconsin: A draft horse, perfect in every particular, is represented by 100 points. These are subdivided into a detailed and com-

plete survey of the animal, involving 36 specifications. To each specification is given a weight, or value, of 1 to 10 points, corresponding to its importance in making up the perfect animal. This weighting is a matter of experience, and is changed from time to time. An official score card adopted by a breeders' association, or, in the case of grains, by the produce exchange, is the result of many years of experiment and improvement, both in the description of the specifications and in the weights assigned to each specification. Thus the "general appearance" of the draft horse is now given a weight of 29 points, and this is subdivided into "weight," 5 points, "form," 4 points, "quality," 6 points, "action," 10 points, and "temperament," 3 points. "Head and neck" are given 8 points, subdivided into "head," "forehead," "eyes," "ears," "muzzle," "lower jaw," and "neck," with one or two points each. These standard weights, or values, are printed in a column opposite each specification, and a second, or blank column is provided under the caption "Points Deficient." In using the score card, the "scorer" goes over the horse, noticing in detail all the points specified, and then marks down opposite each his judgment of the degree to which the animal before him is deficient in that particular point. The total of all points deficient is then deducted from 100, and the result is the grade of the animal scored. It is an interesting fact, illustrating the accuracy of this method of standardizing, that recently two horse valuers, one employed by the Wisconsin Railway Commission, and the other by the Milwaukee Street Car Company, in valuing fifty horses belonging to the company, came within one or two points of placing the same value on each horse.

In attempting to adapt the score card method to the housing problem, I have drawn up the following tentative score card for dwelling-houses. The twenty-five specifications can doubtless be greatly improved. Others might be added, and some might be dropped. The weights given to each might be changed materially. The latter, however, is not important, because, if all houses are scored by the field agents according to an agreed scale, any hygienist or economist afterwards can revise the

weighting according to his own theory of the relative weights. The main object is to agree on the specifications, and to state them in such a way that as little discretion as possible shall be left to the field agents. Where measurements are possible, this is easily done, as in the case of "window openings." Where measurements are not possible, the agents must depend on their judgment, but this judgment can be brought close to uniformity by means of "instructions for discrediting when depending on judgment." For convenience I have used only the weights 3 and 6 for those specifications depending on judgment, and have introduced the same kind of instructions as those given in the official score cards for horses and cattle. Further instructions will be found under the several specifications.

When a house is scored in this way, from the standpoint of health, we shall have the "total points deficient," and the "actual score" of that house compared with a perfect or ideal house. We are then in a position to compare the rents or cost of housing by correcting the "nominal rent" by means of the "actual score." I have suggested three standard units of comparison; viz., "rent per room," "rent per 100 sq. ft." of floor space, and "rent per 1,000 cu. ft." of air capacity. Taking "rent per 100 sq. ft.," which is probably the fairest unit under all circumstances, it can easily be seen that, of two houses renting nominally at \$1.00 per month per 100 sq. ft., if the "actual score" of one is 80 and the other 50, the "real rent" of the one is \$1.25 and the other \$2.00 for the unit of house accommodation compared with the real rent of \$1.00 for a perfect house.

DWELLING HOUSE SCORE CARD

Applies to a single Family or Household

State.....City.....Street.....No.....

Name of Owner.....Name of Occupant.....

Name of Investigator.....Date.....

Instructions for Discrediting when Depending on Judgment

Deduct from possible 6; very slight, 1; slight, 2; marked, 3; very marked, 4; extreme, 5.
Deduct from possible 3; very slight, $\frac{1}{2}$; slight, 1; marked, $1\frac{1}{2}$; very marked, 2; extreme, $2\frac{1}{2}$.

I.—DWELLING—100 POINTS	Possible Score	Points Deficient	Actual Score
LOCATION—18 Points	(18)	()	()
1. General Character of Neighborhood, villa, farm, residence, park (Discredit for factory, alum, neglected district)	3		
2. Elevation, high ground, sloping away on all sides	3		
3. Condition of Street, width (ft.), clean, smooth, hard, free from dust, sprinkled, flushed, free from refuse	3		
(Indicate whether asphalt, block stone, macadam, cobble, wood, dirt)			
4. Smoke, free from (indicate source)	3		
5. Odors, free from nauseous (indicate source)	3		
6. Dust, free from (indicate source)	3		
CONGESTION OF BUILDINGS—26 Points	(26)	()	()
7. Character of Dwelling—10 Points			
Detached	10		
Attached, separate entrance, discredit 1 point			
Attached, common entrance, discredit 2 points			
Flat (entire floor), discredit 3 points			
Apartment (2 or more on same floor), discredit 4 points			
Basement (over $\frac{1}{2}$ above street level), discredit 5 points			
Cellar (over $\frac{1}{2}$ below street level), discredit 6 points			
Additional discredits for flat or apartment without elevator, 2d floor 2 points, 3d floor 3 points, etc.			
8. Sunlight—16 Points			
Height and distance of next building (use foot of its own window in case of flat or apartment, otherwise foot of lower window, as base line above which to measure height of next building)			
Direction Height Distance Per Cent			
(Ind. street or alley) (feet) (feet) (Height=100)			
North	3		
South	5		
East	4		
West	4		
(If distance equals or exceeds height, no points deficient— distance is less than height, actual score is same per cent of possible score as distance to height, e.g., if distance=20% of height, actual score=20% of possible score, etc.)			
WINDOW OPENINGS—11 Points	(11)	()	()

Rooms (Indicate kit- chen, sleep- ing, bath, etc.)	Window Space (Sq. Ft.)	Floor Space (Sq. Ft.)	Per cent Window Space (Floor space= 100)
1.....			
2.....			
3.....			
4.....			
5.....			
6.....			
Total.....			
Number of Rooms (including dark rooms)			
having window space less than 20%.....			
Per Cent of same to total rooms.....			
Number of Dark Rooms.....			
Per Cent of same to total rooms.....			

DWELLING HOUSE SCORE CARD—Continued

I.—DWELLING.—100 POINTS.		Possible Score	Points Deficient	Actual Score
9. Total Window Space, not less than 20% of total floor space. (Discredit $\frac{1}{2}$ point for each deficiency of 1%—e.g., window space 16% of floor space, discredit 1 point, leaving actual score 4)		5	.....	.....
Distribution of Window Space—6 Points				
10. Deficient Rooms, no room less than 20% (Discredit same per cent of possible score as per cent of rooms having window space less 20 per cent, e.g., 6 room house, 2 rooms deficient, discredit $\frac{1}{3}$ of 3=1, leaving actual score 2)		3	.....	.....
11. Dark Rooms, no room without window openings (Discredit same per cent of possible score as per cent of dark rooms, e.g., 6 room house, 1 dark room, discredit $\frac{1}{3}$ of 3=1, leaving actual score 2)		3	.....	.....
Notice: dark room is discredited also above as "deficient room."				
AIR AND VENTILATION—13 Points	(13)	()	()	
12. Heating Arrangements, adapted to secure circulation of fresh air, such as open fire-place, hot air furnace, stove (connecting directly with chimney in same room) (Discredit 1 point for steam or hot water, $\frac{1}{2}$ point for each stove connecting with chimney in another room)		4	.....	.....
13. Temperature, adapted to secure even temperature, not excessive heat or cold, equal in different rooms (Discredit proportionately for each room without heating appliance)		3	.....	.....
14. Dampness, freedom from (indicate whether cellar, kitchen, sleeping rooms, other rooms)		6	.....	.....
STRUCTURAL CONDITION—6 Points	(6)	()	()	
15. Material (Indicate whether wood, brick, stone, concrete), no decayed wood, walls, floors, ceilings in good condition (Discredit $\frac{1}{2}$ point for papered walls or ceilings)		3	.....	.....
16. Size of Rooms, height of ceiling, not less than 9 feet (Discredit $\frac{1}{2}$ point for each foot deficient)		1	.....	.....
17. Floor Space (no room less than 120 sq. ft.) (Discredit proportionately for each room less than 120 sq. ft.)		2	.....	.....
HOUSE APPURTENANCES—26 Points	(26)	()	()	
(Discredit total score in each case if appurtenance not provided)				
18. Bath (Discredit 2 points for common bath)		4	.....	.....
19. Closet in dwelling (Discredit 1 point for common closet, 2 for outhouse, with sewer connection, 3 without sewer)		4	.....	.....
20. Sink (Discredit $\frac{1}{2}$ for common sink)		1	.....	.....
21. Laundry (Discredit $\frac{1}{2}$ for common laundry)		1	.....	.....
22. Running water in house (Discredit 1 point for common hydrant, 2 for hydrant outside, 3 for well outside)		4	.....	.....
23. Condition of Appurtenances, good material and workmanship, all pipes exposed		6	.....	.....
24. Quality of Water for drinking		3	.....	.....
25. Quality of Water for bath and laundry		3	.....	.....
DWELLING TOTAL	100			
COST OF HOUSING				
Rent per month \$	Rental value (if occupied by owner) \$			
Unit of Comparison	Nominal Rent	Real Rent		
Rent per room	\$	\$		
Rent per 100 sq. ft.	\$	\$		
Rent per 1,000 cu. ft.	\$	\$		
Probable income of family per month \$				

The foregoing applies solely to the house itself or to the landlord as responsible for the house. But the conditions of health and the cost of housing are modified by the attitude and circumstances of the occupants. These should be separated from the other problem by means of a separate score card. Here the problem of "congestion of occupancy" is paramount, and the unit of comparison is the "rent per occupant." The actual score on the "occupant" card becomes a coefficient of the actual score on the "dwelling" card, and this combined score gives the grading of the unit of housing accommodation as provided by the landlord and modified by the tenant. If, for example, two houses are scored 80 and 50 respectively on the "dwelling" card, and the occupants of each are scored alike at 70 on the "occupant" card, then the combined dwelling and occupant scores are 56 and 35 respectively. If, then, the nominal rent is \$2.00 per occupant, the real rents are \$3.57 and \$5.71 per occupant, compared with \$2.00 for the standard dwelling occupied by the standard tenant.

II.—OCCUPANTS—100 POINTS	Possible Score	Points Deficient	Actual Score
CONGESTION OF OCCUPANCY—61 Points	(61)	()	()
Occupants, number			
Family, 10 years old and over, male			
female			
Lodgers, Domestic, 10 years old and over, male			
female			
Children under 10 years			
Total (Child under 10 as $\frac{1}{2}$ person)			
1. Cubic Air Space (average height of ceiling by total floor space), cu. ft.			
Cu. ft. per occupant	50		
No discredit if 1000 or over			
(Discredit 1 point for each 20 ft. below 1000, e.g., 600 cu. ft. discredit 20 points, leaving actual score 30)			
2. Sleeping Rooms per occupant	11		
(Discredit 1 point for each person in excess of number sleeping rooms)			
CONDITION OF AIR AND VENTILATION—18 Points	(18)	()	()
3. Windows, kept open to fresh air			
Living rooms	3		
Sleeping rooms	6		
4. Temperature, kept even, not excessive heat or cold	3		
5. Dust, care in avoiding dust by sweeping, no home workshop	6		
CLEANLINESS, care and attention, no rubbish, dirt, grease or refuse,—21 Points	(21)	()	()
6. Hallways	3		
7. Floors	3		
8. Walls	3		
9. Plumbing	6		
10. Yard	6		
OCCUPANTS TOTAL	100		
Rent per occupant, nominal	\$		
Real rent per occupant (compared with standard)	\$		

The foregoing scheme of standardization has been submitted to a number of hygienists and economists, and, while there is a variety of opinion regarding details, there is a striking unanimity as to the need and value of standardization itself. If the matter were to be taken up in a comprehensive way, there is no reason why standardization should not be established in hygiene and economics as it is in agriculture and engineering.

DEVICES FOR AVOIDING ERROR.

BY GEORGE K. HOLMES.

A deal of drudgery should accompany the tabulation of statistical material, the preparation of printer's copy derived therefrom, and the verification of proofs. During many years of contact with professors and students of colleges and universities, with officials of State bureaus of labor, and with persons, official and unofficial, engaged in statistical work, the writer has often observed a want of safeguards against error. Instead of assuming, as should be assumed, that every conclusion is wrong until fortified by verification, it is not infrequently the habit of workers to regard results as true if obtained by themselves. What statistician of experience has not heard a clerk say, "I am sure that this is right, because I did it myself," or "I never make an error"? Such clerks are the most dangerous ones in a statistical office, and are not to be trusted at any time or for any purpose, unless under precautions beyond their control or even knowledge.

A common method of verifying a copy of a statistical table and of text relating thereto, as well as of verifying a proof, is to depend solely upon reading back to copy. In consequence of this, publications, whether statistical or otherwise and whether governmental or of other origin, contain many errors. Indeed, some publications are really "honey-combed" with errors. The report of the census of agriculture of a certain State contains a series of tables in which there is a presentation of number of acres and numbers of units of production of principal crops by counties,—simple statements, covering no great number of pages. The accuracy of the publication being called in question, an attempt to prove the additions resulted in the discovery of many hundreds of errors on the face of the tabu-

lar statements. No one familiar with precautions against errors in statistical work could have any confidence in the accuracy of the work that produced those tables.

It is a common observation in the use of statistical matter published by State bureaus of labor, boards of agriculture, other State offices, and, indeed, by some national offices, that there has been a failure to follow a safe course of procedure in office work and in verifying printed matter, and the published productions of college and university professors and students are far from being exempt from this characterization.

The observation of the writer has been that professors and graduate students of universities and colleges possess a mind trained to establish facts, but one almost without precautions to preserve facts in their transfer from the primary source to the stereotyped printed page. It is no attempt at exaggeration to say that a girl graduated from a high school not longer than one or two years previously can better be trusted to safeguard the transfer than they can.

A common sole reliance for the verification of a copy or of a proof is a reading back to the original. This proceeding is fraught with errors. While it is wise to read back to copy or to original to discover the bulk of the errors, a sole dependence upon this proceeding is sure to leave many errors undiscovered.

Such being the general situation, an excuse is offered for the presentation of a formulated description of precautions against error in the statement that follows. These are based upon the many years' experience of the writer and of other persons engaged in statistical work. They may be depended upon to eliminate error almost completely. The qualification "almost completely" is made because there are two or three sources of error which no prevision can avoid, namely: (1) the concerted dishonesty of workers; (2) compensating errors, as when a plus error is counterbalanced by a minus error,—a very rare occurrence, yet one which may and does occur; and (3) the repetition of an error in the same place by different persons working at different times and independently of each other. The last error is exceedingly rare, and yet it does occur. An instance

is called to mind in which a series of percentages were computed, all proving to 100 after justification. Three persons performed this work, the results of each being unknown to the others, and the results were the same in every particular; yet a fourth person repeating the operation discovered a common error which the preceding three had committed. An experience of this sort might not be repeated probably in a lifetime.

For the use of practical workers in statistics, whether in educational institutions or in government offices, who are relying solely upon their own work and upon reading copies and proofs back to originals, the following is offered:—

RULES TO GOVERN WORK.

Table-making:

Table-making generally to be in duplicate when feasible; when not, the figures, additions, and computations to be verified by a second worker.

When tables are made in duplicate or are to be copied, having columns without totals, the columns are to be added to get totals for "check" purposes.

In comparing duplicate tables, or in verifying a table, or in verifying a copy of a table or of text, do not erase a figure supposed to be wrong: use red ink to correct it above.

Use red ink for total lines.

Persons who do duplicate work, or first work and its verification, are not to confer with each other concerning differences nor to consult with each other before finishing work.

The initials of each person doing work should appear at an upper corner of the first sheet, together with a statement as to what work was done: thus, "Compiled," "Verified," "Compared," etc.

Making and verifying copies of tables:

Do not copy total lines; get totals by adding copy and compare with original.

If original has no total lines, add to get them for "check" purposes; also add the copy, and compare.

Read copy back to original before adding.

Text "copy":

To be verified from accompanying tables or from original sources.

A copy of this to be verified by at least one reading back and by procedure of preceding paragraph.

First galley proof of tables and text:

Read critically, and make thereon all superficial corrections.

Copy on retained proof or elsewhere for future use the "check" totals of tables of printer's copy.

First page proof of tables:

See that all corrections indicated on galley proof have been made.

Add columns to prove to total lines and to "check" totals.

Cross-add to total columns.

Make all computations that can be made from the proof.

First page proof of text:

See that all corrections indicated on galley proof have been made.

Make all computations that can be made from the proof.

Verify from accompanying tables and from printer's "copy."

Second page proof of tables and text:

Read last column of tables back to copy, and add. (Types will fall down and not get back to their proper places.)

See that all corrections indicated on first page proof have been made.

Departures from the foregoing are permissible for special and good reasons, depending on the importance of the work, the ability and honesty of clerks, and the practical difficulties that are encountered; but not at the discretion of any one but the person in charge.

THE COST OF MUNICIPAL GOVERNMENT IN MASSACHUSETTS.

BY EDWARD M. HARTWELL.

The caption of this article is the chief title of Public Document No. 79, 1908, whose sub-title is "First Annual Report on the Comparative Financial Statistics of the Cities and Towns of Massachusetts, covering Municipal Fiscal Years ending between Nov. 30, 1906, and April 1, 1907, by the Chief of the Bureau of Statistics of Labor."

This is a noteworthy publication by reason of its significance as well as on account of its contents. It signalizes the opening of a new chapter in the official statistics of Massachusetts, and is indicative of the recognition by the legislature,—belated, to be sure, but still welcome, after four years of urging—of the need of a comprehensive, authoritative annual survey of the financial operations of the cities and towns of the Commonwealth, in addition to the statements of their debts, sinking funds, liabilities, and assets which have been published annually for many years by the Tax Commissioner.

This report makes it possible for the first time to obtain a clear view of the receipts and expenditures of each and all of the municipalities of the Commonwealth without engaging in the ungrateful task of attempting to reduce the reports of 33 cities and 321 towns to a uniform basis in order to extract comparable data.

It is true that at rare intervals incomplete statements of the expenditures of the municipalities of Massachusetts have appeared in public documents, but such statements have differed materially from one another in their scope and in the method of their presentation. Thus, in the report of the Metropolitan District Commission of 1896, certain classes of expenditure of

the twenty-nine cities and towns embraced in the proposed Metropolitan County were set forth for the year 1895; and the total expenditures of each of the cities and towns of the Commonwealth for 1900 were given in the Bulletin of the Bureau of Statistics of Labor for 1905, but without further analysis than sufficed to show how much each municipality expended for charity in that year.

Although the series of reports on the "Statistics of Cities" published by the United States Department of Labor and the Federal Bureau of the Census afford material for showing receipts by sources and expenditures by principal objects, by years, for the period 1898-1906, for the principal cities of Massachusetts, those publications do not serve for the preparation of comparative statements covering all of the cities, not to speak of the towns of the State, since, as a rule, those publications take no account of cities having less than 25,000 inhabitants.

This report should be welcome also to students of municipal affairs outside of Massachusetts, because it affords information regarding the cost of government of fourteen cities of Massachusetts (having an aggregate population of 144,895 in 1905) that are not included in the tables published by the Bureau of the Census. In any survey or study of the political, social, or financial characteristics of American cities, the cities of Massachusetts perforce command attention both on account of their number and variety and of the influences which have shaped their organization and determined their growth and development.

In no other State but Rhode Island do we find so large a proportion of the population living under urban conditions or governed under city charters. If we adopt the nomenclature of the United States Census, and class all communities as urban whose population amounts to 8,000, the aggregate urban population in fifty-six municipalities of Massachusetts in 1900, according to the Twelfth Census of the United States, constituted 76 per cent. of the whole population. On the other hand, if the Massachusetts standard—namely, incorporation under a city charter of municipalities having at least 12,000

inhabitants—be adopted, it appears that in 1905, when the last State census was taken, 67 per cent. of the population and 76 per cent. of the assessed valuation of the Commonwealth were found in thirty-three cities, ranging in population from 595,380 in Boston to 14,073 in Marlborough. Moreover, there are eleven towns, with an aggregate population of 153,011 in 1905, that might claim a city charter, if they chose to, on the sufficient ground of having 12,000 inhabitants. There are also seven towns of from 10,000 to 12,000 inhabitants, having a total population of 76,796. In short, 75 per cent. of the inhabitants of Massachusetts were found, in 1905, in fifty-one cities and towns of 10,000 population or upwards.

In the period 1875-1905, the proportion of the population living in towns of less than 5,000 decreased from 32.83 to 14.28 per cent., while the proportion of persons living in municipalities of over 20,000 rose from 45.26 to 64.44 per cent., and the proportion of persons living in places of more than 30,000 increased from 38.30 to 57.77 per cent. of the total population of the State. He would be a bold man, indeed, who should venture to claim that town and city government had undergone a proportionate improvement during the same period. The growth of urban communities has been too recent and rapid in Massachusetts, as in most States of the Union, for urban traditions to find a congenial soil in which to strike root and flourish. It is hardly a Hibernicism to say that in the United States urban traditions are rural. The inefficiency of city government, which is so much bewailed, is in no small measure attributable to the inevitable inability of incompletely transformed countrymen to adapt outworn and obsolete governmental methods and instruments to modern and urban needs.

Despite the venerable age of the Commonwealth the cities of Massachusetts are relatively immature and still possess features indicative of their rural origin and incomplete development. All of them have assumed the habiliments of city government since 1822, the year in which Boston obtained the first city charter ever granted by the legislature.

Under the Constitution of Massachusetts, from its adoption in

1780 until it was amended in 1821, the only recognized units of local government were "towns, districts, or plantations." The second article of Amendment of the Constitution, adopted by the people April 9, 1821, provided that

the General Court shall have full power and authority to erect and constitute municipal or city governments, in any corporate town or towns in this Commonwealth; and to prescribe the manner of calling and holding public meetings of the inhabitants, in wards or otherwise, for the election of officers under the constitution, and the manner of returning the votes given at such meetings. Provided that no such government shall be erected or constituted in any town not containing twelve thousand inhabitants, nor unless it be with the consent and on the application of the majority of the inhabitants of such town. And provided also that all by-laws, made by such municipal or city government, shall be subject, at all times, to be annulled by the General Court.

The foregoing provisions of the Constitution are still in force, and constitute the nearest approach to a municipal code that the State possesses. The acts of legislature relating to elections, railroads, taxation, and the militia, have all been codified, but not the mass of special acts relating to cities. There is a family likeness in the city charters of Massachusetts, but they have been so amended and modified that their division into genera and species would be a huge and puzzling task. The individualistic nature of Massachusetts municipalities is nowhere more characteristically illustrated than in their financial operations and reports.

It is probable that the proposal to authorize the incorporation of cities by the legislature originated in Boston, but it is certain its principal advocates in the convention were from Boston and Salem, then the two most populous towns in the State. The main argument, that urged by Mr. Lemuel Shaw, of Boston, later chief justice of the Supreme Judicial Court, was that the Constitution, as it stood, "required a form of government not adapted to the condition of a populous town," although he declared that "in this Commonwealth every town is, to all substantial purposes, a city." The remedy required

was "such an organization as is adapted to the condition of a numerous people, such an organization as will admit the inhabitants to meet in sections for the purposes of election, and choose representatives who should meet for purposes of deliberation, instead of the whole body." The convention agreed, by a vote of 223 to 140, to recommend the amendment to the people; but so strong was the predilection of the people for town government, as they knew it, that the amendment was adopted by the bare majority of 62, in a total vote of 28,674. It may be noted, however, that in Boston the vote was 2,462 for the amendment, and only 185 against it. The vote on the proposed amendments to the Constitution was taken throughout the State on April 9, 1821. Before the year was out, a committee, of which Mr. Shaw is reputed to have been the leading mind, reported a form of city charter to the Boston Town Meeting.

Boston outgrew its swaddling-clothes long before its inhabitants could be induced to assume garments suited to its enhanced stature. By 1820, as the Federal Census of that year showed, its population was 43,298. Increase of population and the resulting demands for more elaborate methods of administration had led to its division into wards and to the devising of organs of government not found in the primitive town. The Selectmen, chosen annually in town meeting, no longer exercised full control, subject to the Town Meeting, over the affairs of the town. The Overseers of the Poor and the Board of Health each exercised a semi-independent jurisdiction, and was allotted a special appropriation. Each was composed of representatives of the several wards. The members of the Board of Health were elected, as were the Assessors, in ward meetings. The Selectmen were members of the School Committee, whose other members were chosen out of the several wards by the Town Meeting. The budget annually submitted to the town was framed by a Finance Committee, composed of the Selectmen, Overseers of the Poor, and the Board of Health, which in joint convention chose the Town Treasurer and Collector. The County Treasurer was elected by the town. Boston

paid practically all of the expenses of the County of Suffolk, the management of whose pecuniary concerns was vested by law in the Court of Sessions, composed of five judges, who were "not accountable to the two towns [Boston and Chelsea], of which the County was composed, for any of their proceedings," and had "sole and exclusive authority to direct the County Treasurer in all the business of his office."

The town had repeatedly voted down plans looking to the organization of a city government. Its willingness in 1821 to ask the legislature for a city charter seems to have been prompted, in some measure at least, by its desire to get rid of what it claimed was the anomalous and extravagant commission government exercised by the Court of Sessions. At any rate, the report on October 22, 1821, of a committee appointed "to apply to the Court of Sessions, for a statement giving the details of the expenses of the County of Suffolk," led the town to constitute a committee "to report to the Town a complete system relating to the administration of the Town and County which shall remedy the present evils." The committee, which reported on December 10, was further charged "to report a system of Municipal Government for this town, with such powers, privileges and immunities, as are contemplated by the amendment of the Constitution, authorizing the General Court to constitute City Government." Accordingly, the draft of a charter was submitted to the town on December 31, 1821, which, after some alterations "by the Inhabitants," was accepted by a Special Town Meeting held January 22, 1822. This instrument was, in effect, the charter granted to Boston by the legislature, February 23, 1822 (Chapter 110, Acts of 1821-22), under which Boston's first City Government was organized May 1, 1822. Salem was the first town to follow Boston in procuring a city charter, but not till 1836, although it had had upwards of 12,000 inhabitants since 1810.

The following extracts from the Revised Laws of Massachusetts, 1902, may serve to show how tenaciously the law-givers of the State cling to their predilection for the conceptions and forms which underlie town government. Chapter 25 is

entitled "Of Towns and Town Officers," and Chapter 26 is entitled "Of Cities." Section 2 of Chapter 26 runs as follows:—

Chapter twenty-five and all other laws relative to towns shall apply to cities so far as consistent with the general or special laws relative thereto; and cities shall be subject to the liabilities, and city councils shall have the powers, of towns; the mayor and aldermen shall have the powers and be subject to the liabilities of selectmen, and the city clerks, treasurers, and other city officers, those of corresponding town officers, if no other provisions are made relative to them.

The cities of Massachusetts are not yet sufficiently mature to breed their own citizens. In 1905 the aggregate enumerated population in thirty-three cities was 2,024,325; but only 766,442, or 37.86 per cent. of that number, were natives of the cities in which they lived; 577,730, or 28.54 per cent., born elsewhere than in the cities where they resided, were natives of the United States; and 680,153, or 33.60 per cent., were foreign-born. Or, to state the matter differently, out of 2,024,325 persons resident in the cities of Massachusetts, 1,257,883, or 62.14 per cent., were immigrants, and 680,153 were foreign-born immigrants. The aggregate population of the 321 towns amounted to 979,355, of which 237,891, or 24.29 per cent., were foreign-born, 403,401, or 41.19 per cent., were born elsewhere in the United States than in the town where they were found by the census enumerators, while 338,063, or 34.52 per cent., were natives of the town in which they lived.

The proportion of inhabitants who were born in their home city varies considerably. Thus in Boston, in 1905, it was 42.90 per cent. of the whole population, while in certain cities adjoining Boston it was less; *e.g.*, 29.59 in Chelsea, 28.64 in Newton, 24.30 in Medford, and only 18.53 in Everett. Each of the four cities, it may be noted, is considerably younger than Boston, and has latterly grown considerably faster. Moreover, in Medford 49.80 and in Everett 49.41 per cent. of all persons reported by the census as engaged in gainful pursuits were reported as working in Boston. In the towns of Revere and Winthrop more than half of their working population was

reported as "working in Boston." In Revere 17.33 per cent. of the total population were born there, and in Winthrop only 17.70 per cent. were natives of Winthrop.

In twelve cities outside of Boston, but within ten miles of the State House, having an aggregate population of 487,753 in 1905, only 148,260, or 30.40 per cent., were natives of their home city; while in the other twenty cities outside the ten-mile circuit, with 941,192 inhabitants, 362,743, or 38.50 per cent., were born in the city in which they lived.

The possession of special funds derived from an unusual source seems to exert a peculiar influence upon untrained and careless financiers. For instance, in 1710/11 Boston sold certain lands known as the Blue Hill Lands, situated in the town of Braintree, for £1,500. They were common lands which Boston had retained in 1640 (when Braintree was set off from Boston), and set apart for the benefit of its Free School. The town voted, May 9, 1710, that the £1,500 should be "invested and laid out in some Real Estate for the use of the Public Latin School, . . . the principal stock not to be diminished." A Special Committee and the Selectmen were empowered to invest the money, which was to be paid in instalments, and to let the proceeds at interest pending their investment in real estate. But the committee and the Selectmen voted, March 23, 1712/13, "to take at interest so much of the Blue Hill money as is now in the Treasury with what is shortly to be paid by the Braintree men, for discharge of the debts and growing charges of the Town until the Select Committee and Selectmen shall recall the same."

In August of the same year £600 were applied to the purchase of corn, on condition that it be returned with interest. In December, 1713/14 the committee and the Selectmen voted to apply, under similar conditions, £100 for the purchase of a water engine, "already secured by the Selectmen." June 13, 1714/15, the town voted that the vote of May 9, 1711, "be Reassumed," and that "the produce of the Blue Hill Lands shall be applied for the purchasing of corn or other provisions as the Town shall direct." Thus the fund came to be used as

capital for supplying the town with grain,—a policy followed for upwards of fifty years. It is probable that the sums borrowed from the fund in the interval, 1712–1715, were repaid, but it does not appear from such records as are accessible that the Public Latin School derived any benefit from the fund, though it may have.

The report under review affords curious proof of the survival of primitive notions and practices as to the management of special funds by fiscal officers. Part IV., pages 2211–2258, is devoted to statements of the Public Debt and Sinking Funds of Cities and Towns. The purposes for which the debt outstanding in 1906 was created are quite fully set forth. Among such purposes the rubric “Trust funds borrowed for municipal purposes” challenges attention quite as sharply as “No Debts” in the case of sixty-two towns, ranging in population, in 1905, from 6,754 in the case of Bridgewater to 87 in Mount Washington.

The following statements compiled from the tables referred to speak for themselves:—

A. CITIES OF MASSACHUSETTS INDEBTED TO TRUST FUNDS, 1906.

Name of City.	Population (1905).	Amount Borrowed from Trust Funds for City Purposes. (Outstanding in 1906.)
1. Fall River	105,762	\$107,708
2. Lowell	94,889	86,000
3. Salem	37,627	85,000
4. Fitchburg	33,021	48,580
5. Gloucester	26,011	34,700
6. Medford	19,686	37,294
7. Newburyport	14,675	79,750
8. Marlborough	14,073	12,456
Totals	345,744	\$441,488

B. TOWNS OF MASSACHUSETTS INDEBTED TO TRUST FUNDS, 1906.

Name of Town.	Population.	Amount Borrowed from Trust Funds for Town Purposes.
1. Leominster	14,297	\$39,239.00
2. Clinton	13,105	4,825.00
3. Framingham	11,548	38,466.92
4. Methuen	8,676	3,378.76
5. West Springfield	8,101	8,603.31
6. Milton	7,054	26,397.61
7. Braintree	6,879	22,500.00
8. Andover	6,632	25,000.00
9. Stoughton	5,959	25,000.00
10. Winchendon	5,933	9,665.00
11. Westborough	5,378	4,000.00
12. Grafton	5,052	6,360.00
13. Millbury	4,631	8,135.00
14. Provincetown	4,362	8,155.00
15. Barnstable	4,336	20,361.37
16. Warren	4,300	15,226.74
17. Templeton	3,783	3,401.20
18. Manchester	2,618	1,309.22
19. Hopkinton	2,585	8,186.00
20. Lancaster	2,406	5,260.00
21. Charlton	2,089	2,600.00
22. Sharon	2,085	14,194.23
23. Southborough	1,931	3,750.00
24. Bourne	1,786	3,325.00
25. Chatham	1,634	8,904.46
26. Norwell	1,534	3,300.00
27. Sterling	1,315	3,300.00
28. Sudbury	1,159	26,453.00
29. Wellfleet	958	1,753.02
30. Wenham	924	3,475.00
31. Princeton	907	1,000.00
32. North Reading	903	3,000.00
33. Ashby	865	1,166.60
34. Lanesborough	845	7,255.69
35. Truro	743	1,400.00
36. Phillipston	442	430.00
Totals	147,755	\$360,622.13

One is inclined to suppose that the unvarnished statements of Mr. Gettemy's tables, showing the recourse of so many cities and towns to their trust funds in order to eke out their income, should tend to discourage, if not abate, such practices. But the truth is that evidence of such practices has been furnished for

some years by certain tables contained in the annual reports of the Tax Commissioner of Massachusetts, only one must read between the lines to apprehend the tables.

If one takes up at random a report of the Tax Commissioner (Public Document No. 16),—*e.g.*, that of 1899,—he will find statements of the assets and liabilities of all the towns and cities of the State, arranged under one alphabet. In the majority of cases in which “trust funds” are reported, the entries on both sides of the statement balance exactly. In certain cases the liability exceeds the asset; *e.g.*, that of Worcester, which in 1899 had trust funds amounting to \$304,724 among assets, against “Trust Funds” \$363,547 under liabilities. For 1906, the corresponding entries are \$322,571 and \$443,610, respectively. In 1907 the amount of trust funds is \$474,801 on both sides of the account. Again, in the report for 1899 Medford’s assets include nothing for trust funds, but \$46,376 appears among its liabilities under trust funds. In 1906 the corresponding entries were nothing and \$37,294. In the case of Salem, in 1899, assets and liabilities, as regards trust funds, each amounted to \$105,425. In 1905, Salem was reported as having \$95,000 of liabilities for trust funds, with no trust funds on the assets side, while in 1906 the liability is \$90,000, and again no trust funds among its assets.

The Tax Commissioner’s report for 1906 showed thirty municipalities to be indebted to their trust funds. In eight of them the liabilities greatly exceeded the assets, while the remaining twenty-two were reported as having no trust funds among their assets. The names of eight municipalities in the 1906 list are found in the corresponding list for 1899. It would appear from the reports of the Tax Commissioner, as well as from the tables introduced above based on Mr. Gettemy’s tables, that the custom of borrowing from trust funds for municipal purposes (whose precise nature cannot be determined from either set of tables) is fairly common among both the cities and towns of Massachusetts.

It may be noted, in passing, that the reports for 1906 of the Tax Commissioner and the Bureau of Statistics of Labor do

not agree either as to the number of cities and towns which were indebted to their trust funds or always as to the amounts of such indebtedness when the names of the municipalities are found in both reports. The discrepancies may be accounted for, perhaps, by reason of the reports covering different intervals of time and of differences of method in securing the data on which the respective tables are based. If an analysis could be had showing the nature of the objects to which the sums borrowed from trust funds were applied, it would doubtless be instructive.

Boston has been loudly and frequently criticised for issuing bonds to meet various current expenses. Mr. Gettemy's tables show that in 1906 the following-named cities had created debt to meet assessments levied by the Commonwealth on account of the system of Metropolitan Parks:—

DEBT OUTSTANDING IN 1906 FOR METROPOLITAN PARK ASSESSMENTS.

Name of City.	Amount of Debt.
Cambridge	\$46,000
Lynn	23,000
Newton	20,000
Medford	27,000
Somerville	23,000

In this connection it may be remarked that it can be shown, from their financial reports, that nearly half of the cities of the Commonwealth have, in recent years, issued bonds to meet the cost of paving and making other repairs upon their streets.

Borrowing from trust funds for municipal purposes and the creation of funded debt to defray current expenses are indications of the strong aversion common among city and town officials to meet enhanced expenses by increasing the tax levy. Pay as you go, seems not to be a popular maxim in this generation. Perhaps it never was anything but a counsel of perfection.

The following statement shows the length to which some Massachusetts cities are willing to go rather than increase the tax rate. The figures are taken from the official reports of the cities mentioned:—

LOANS ISSUED TO MEET DEFICITS IN APPROPRIATIONS.

Name of City.	Object of Loan.	Amount.	Year issued.
Lowell	Department Deficiencies	\$54,000	1905
Lowell	General Treasury Deficiency	71,000	1906
Lynn	Municipal Deficiency	56,000	1897
	" "	35,500	1898
	" "	20,000	1900
	" "	26,000	1902
	" "	8,000	1903
	" "	8,000	1904
	" "	6,000	1906
Quincy	Poor Department Deficiency	3,000	1904

Part III. of Mr. Gettemy's report comprises three tables, namely: A, showing the gross debt, sinking funds, and net debt, etc., of the thirty-three cities, ranked according to the percentage of net debt to valuation; B, in which the same facts are set forth for 259 towns; and C, giving the population and valuation of sixty-two towns having no debt. But Mr. Gettemy warns his readers that the statistics of A and B "cannot have a secure scientific basis, for the reason that the valuation figures of the various municipalities are not fixed by any central authority." Freedom from systematic central administrative control and diversity of usage in handling their fiscal concerns is, indeed, a marked characteristic of Massachusetts municipalities as a class, although the cities, more especially the larger ones, find it necessary to make frequent appeals to the legislature for power to work out new local problems as they arise.

Section 51, Chapter 12, of the Revised Laws of Massachusetts, 1902, contain a provision, of long standing, that "the assessors of each city and town shall make a fair cash valuation of all the estate, real and personal, subject to taxation therein," and every assessor throughout the Commonwealth is required by Section 68, Chapter 25, of the Revised Laws, to take oath that he "will neither overvalue nor undervalue any property subject to taxation." The tendency of municipal officials to follow their own devices is illustrated by the following statements showing the proportion of assessed to actual value of taxable property in certain cities and towns of Massachusetts. The

statements are compiled from the *Financial and Commercial Chronicle*, published in New York City, for the years mentioned;

A. CITIES.

City.	1904.	1905.	1906.	1907.
1. Brockton	$\frac{1}{2}$ of actual value	$\frac{1}{2}$ of actual value	$\frac{1}{2}$ of actual value	as near actual value as can be ascertained
2. Chicopee	not given	not given	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value
3. Gloucester	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value
4. Haverhill	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	at fair cost value
5. Lawrence	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about market value
6. Lynn (Real Estate)	about $\frac{1}{2}$ of cash value	about $\frac{1}{2}$ of cash value	about $\frac{1}{2}$ of cash value	about $\frac{1}{2}$ cash value
7. Marlborough . .	$\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value
8. Newburyport . .	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value	about $\frac{1}{2}$ of actual value
9. Northampton . .	about 80% of actual value	about 80% of actual value	about 80% of actual value	about 80% of actual value
10. Springfield . . .	about 90% of actual value	about 90% of actual value	about 90% of actual value	about 90% of actual value
11. Taunton	about 90% of actual value	about 90% of actual value	about 90% of actual value	about 90% of actual value

In the case of the remaining twenty-two cities in Massachusetts, either the proportion of assessed to actual value is not stated, or it is stated as "about full value," "full and fair cash value," "about market value," "fair cash value," "about actual value," etc.

B. TOWNS.

Town.	Population in 1905.	Proportion of Assessed to Actual Value.
1. Easthampton	6,808	about 90% of actual value
2. Framingham	11,548	about $\frac{1}{2}$ of actual value
3. Methuen	8,676	about $\frac{1}{2}$ of actual value
4. North Andover	4,614	about 70% of actual value
5. Norwood	6,781	about 90% of actual value
6. Rockport	4,447	about 75% of actual value
7. Southbridge	11,000	about $\frac{1}{2}$ of actual value
8. Spencer	7,121	about $\frac{1}{2}$ of actual value
9. Stoneham	6,332	80-90% of actual value
10. Walleale	6,189	$\frac{1}{2}$ of actual value
11. Westborough	5,378	$\frac{1}{2}$ of actual value
12. Westfield	13,611	about $\frac{1}{2}$ of actual value
13. Williamstown	4,425	71% of actual value
14. Winchester	8,242	about $\frac{1}{2}$ of actual value

Another obstacle in the way of securing "complete comparability of municipal statistics," instanced by Mr. Gettemy, is the wide range in the dates at which fiscal years close. He calls attention to the fact that, in sixteen of the cities, the calendar and fiscal years coincide, while eleven close their books November 30, as does the Commonwealth; and two (namely, Boston and Waltham) close theirs on January 31. The wider range among the towns, which is set forth in detail, is attributed to their annual meetings being scattered through four months of the year. The cities have all been established since the reckoning of time in accordance with the Gregorian calendar has become a matter of course, and their preference for the modern calendar is easily explicable. Of the cities, twenty close their books in the last calendar month, two in the first calendar month, and eleven in November.

Boston's fiscal year closed on April 30, from the incorporation of the city in 1822 down to 1891, excepting the years 1823-25, inclusive. In 1892 the present termination of the fiscal year (namely, January 31) was adopted. The long-continued persistence of April 30 as the close of the fiscal year seems to be owing to the custom of the town of Boston, at least during its later years, to have the treasurer's accounts audited as of April 30, apparently that they might be considered at "the May Meeting," at which appropriations were usually voted. In Boston, even down to 1821, the March meeting, as is still the case in most towns, was considered the principal town meeting, as it was the occasion for the annual election of town officers. But it was the custom, as early as 1791 and as late as 1821, for the March meeting to vote "that the consideration of all money matters be referred to the May meeting."

The proverbial importance of the March meeting is doubtless attributable to the fact that down to 1751, when the New Style calendar year, so called, was adopted by Parliament, "the First Month" was called "March" throughout the British Colonies, as well as in the mother country.

The following tabular presentation, based on the dates of the close of the fiscal year given in Mr. Gettemy's tables, illustrates the influence of use and wont in determining the course of procedure, in the conduct of prudential concerns, in the towns of Massachusetts:—

CLOSE OF FISCAL YEAR IN MUNICIPALITIES OF MASSACHUSETTS, 1906.

Old Style Year.				New Style Year.		
	First Month (March).	Last Month (February).	Total.	First Month (January).	Last Month (December).	Total.
Towns: number of	75	111	186	44	90	134
Cities: number of	—	—	—	2	20	22

One town closes the year on April 1, and 11 cities close in November.

The not unnatural preference of both towns and cities for closing their accounts in the last month of the year is clearly indicated by the foregoing statement.

The report under review is so well arranged and printed that it should not repel readers, as do so many American statistical publications, more particularly those of the familiar official type. It affords a good example of what may be accomplished towards making statistical text and tables readable, and even attractive, by utilizing the resources of modern typography. We venture to hope that the Bureau of Labor Statistics, in setting forth the cost of municipal government, may be enabled soon to escape the thralldom of the conventional octavo page, as has the Federal Bureau of the Census. On the whole, the correspondence in terminology and classification between Public Document No. 79 and the Federal Census Bureau's "Statistics of Cities" is sufficiently close to secure a fair degree of comparability between such tables of the two publications as cover like matters.

Another notable and praiseworthy feature of the report, a feature that might almost be characterized as an innovation, is the due prominence given to the financial operations and status of the cities as compared with the towns. The two are not printed under one alphabet, as is usually the case. Part I. consists of thirteen tables, devoted wholly to the maintenance cost, by departments, of the thirty-three cities; while six of the seven analysis tables which precede Part I. relate to cities only, and include all of the cities. Again, in Part II., which is made up of summarized statements (modelled on the group system of the National Municipal League as modified by the Bureau of the Census) of receipts and payments by cities and towns graded according to population, the cities are placed first in a group by themselves. The same system of grouping obtains, also, in Parts III. and IV., devoted respectively to Municipal Indebtedness Compared with Assessors' Valuations and Public Debt and Sinking Funds.

The usefulness of the tables is materially enhanced by an introduction, in which the sources, character, and limitations

of the tables are frankly discussed, and certain recommendations, involving legislation, are made. Comments and comparisons based on the salient facts brought out by the tables are of frequent occurrence in the text. However, Mr. Gettemy is cautious in interpreting his tables, and careful to point out pitfalls that headlong devotee of the vain comparative might naturally fall into.

As might be expected, in compiling its first report in a new field, the Bureau has encountered difficulties in securing completely comparable data from towns and cities whose fiscal operations and original accounts are far from perfectly adapted to readily furnishing abstracts in conformity with the uniform schedules sent out by the Bureau. After Mr. Gettemy became Chief of the Bureau, it was decided to modify the original schedule sent out in 1906 by his predecessor to the cities, but, to avoid undue delay, it was not considered advisable to modify the schedules used in securing returns from the towns.

The receipts and payments of all cities are totaled in a recapitulatory statement, but a similar statement for all towns is not given lest incorrect comparisons between cities as a group and towns as a group should be made. But assurance is given that in the next report "the statistics for the towns will be classified in uniformity with those for the cities, and the Bureau will be able to present a consolidated balance sheet showing the aggregate receipts and expenditures for all of the municipalities."

By reason of the numerous and radical plans proposed recently for reforming the government and financial operations of Boston and the region roundabout, unusual interest attaches at present to the so-called Metropolitan District; i.e., the thirty cities and towns, including Boston, which are situated within ten miles of the State House. Furthermore, the Metropolitan District is deserving of special study because within the jurisdiction of its thirteen city and seventeen town governments, which amount to nearly one-tenth of the whole number in the State, four-tenths of the population, four-tenths of the registered voters, and six-tenths of the assessed valuation of the

TABLE I.

III. TOTAL PAYMENTS FROM REVENUE. AND FOR PRINCIPAL OBJECTS.

State were found in 1905. Hitherto—*i.e.*, prior to the publication of Mr. Gettemy's report—no specific data concerning the annual cost of government of the cities having less than 30,000 inhabitants, or of most of the towns, could be had without inordinate labor. Table I. has been compiled by the writer from Public Document 79 for a special study of the Metropolitan District. It is embodied in this article because it serves to indicate the timeliness and value of that document as a source of information. It should be added that division of the district into zones has been made because it appears from previous studies of the writer that the different sections of the district present different rates of growth in population and wealth. The first zone includes cities and towns that are contiguous to Boston, the second zone being composed of municipalities that are not contiguous to Boston, but are within the ten-mile circuit.

The population of the Metropolitan District by zones and subdivisions in 1905, and the percentage of increase, by five-year periods in the interval 1890–1905, is shown in the following tabular statement:—

METROPOLITAN DISTRICT.

	Population, 1905.	Per Cent. of Increase of Population.		
		1900 to 1905.	1895 to 1900.	1890 to 1895.
Boston	595,380	6.15	12.87	10.80
First Zone	386,018	11.28	17.35	21.92
6 cities	298,009	10.61	16.14	29.46
8 towns	88,009	13.50	21.76	0.58
Second Zone	245,460	11.07	12.89	17.06
6 cities	189,744	10.88	20.86	27.60
9 towns	55,716	11.70	7.93	*3.72
Both Zones	631,478	11.19	15.57	19.94
District	1,226,858	8.69	14.21	15.16
Boston	595,380	6.15	12.87	10.80
12 cities	487,753	10.72	17.93	28.75
17 towns	143,725	12.85	8.10	*1.44

* Decrease.

Following is a statement of the valuation and net debt of the District in 1906:—

METROPOLITAN DISTRICT, 1906.

	Valuation.	Net Debt.
Boston	\$1,289,705,887	\$67,834,934
First Zone	487,119,498	21,593,530
6 cities	307,156,145	17,159,984
8 towns	179,963,353	4,433,546
Second Zone	232,391,524	10,036,730
6 cities	167,546,448	6,744,655
9 towns	64,845,076	3,292,075
Both Zones	719,511,022	31,630,260
District	2,009,216,909	99,465,194
Boston	1,289,705,887	67,834,934
12 cities	474,702,593	23,904,639
17 towns	244,808,429	7,725,621

There are two other reports on financial statistics of cities for 1906 that should be mentioned here. They are the report of the Bureau of Inspection and Supervision of Public Offices of the Department of Auditor of State, entitled "Comparative Statistics Cities of Ohio 1906," and the report of the Comptroller of the State of New York, entitled "On Municipal Accounts."

The Ohio document contains a series of nine tables relating to 70 cities for the fiscal year ending Dec. 31, 1906. Of the 70 cities, 9 had 30,000 or upwards of population and 24 had 12,000 or more inhabitants. In each table the cities are arranged according to population as reported by the Twelfth Census of the United States for 1900.

The following statement shows the range of population in round numbers:—

<i>Population (1900).</i>		<i>Number of Cities.</i>
300,000, less than 400,000		2
100,000 " " 150,000		2
50,000 " " 100,000		1
40,000 " " 50,000		2
30,000 " " 40,000		2
20,000 " " 25,000		3
15,000 " " 20,000		7
10,000 " " 15,000		9
5,000 " " 10,000		42
Total		70

The following statement shows the number of cities in Ohio having from 5,000 to 12,000 inhabitants in 1900:—

<i>Population (1900).</i>		<i>Number of Cities.</i>
11,000 12,000		3
10,000 11,000		1
9,000 10,000		2
8,000 9,000		8
7,000 8,000		9
6,000 7,000		12
5,000 6,000		11
Total		46

The tables in this report follow more closely the forms and terminology of the Uniform System of the National Municipal League as recommended in 1902 (in which year the Ohio legislature enacted a bill "to establish a uniform system of public accounting, auditing, and reporting under the administration of the Auditor of State") than does either the "Statistics of Cities" issued annually by the Federal Bureau of the Census or the "Cost of Municipal Government in Massachusetts." Although this report is marked by an extreme paucity of explanatory text and an utter absence of summary tables and analyses, on the whole it resembles more nearly the Census Bureau's publications than Mr. Gettemy's report. It is more comprehensive, however, so far as it goes, than the latter, in that receipts and expenditures are more fully itemized.

The Ohio report is unlike either the Massachusetts or the New York report, inasmuch as it contains no statistics whatever relating to municipalities under town or village government; but the material which it does contain is superior, as regards congruence and comparability, to that contained in

either of the other reports. This was to be expected, partly because the Ohio bureau is older and more fully developed, but chiefly because the Ohio statute of 1902 as amended in 1904 provides for more complete, central control and supervision over the financial operations and reports of municipalities than does the New York act (Chapter 705, Laws of 1905) or the Massachusetts act (Chapter 296, Acts of 1906).

Although the Comptroller of New York "*may* formulate and prescribe a system of accounts which shall be uniform for each class of municipal corporations," namely, counties, cities of the second and third classes,—i.e., all cities except New York and Buffalo,—and all incorporated villages, it is obligatory on the Auditor of Ohio to "formulate, prescribe, and install a system of accounting and reporting . . . that shall be uniform for every public office and every public account of the same class." The Massachusetts act is much milder in its terms and less comprehensive in its scope than either of the other acts mentioned.

While the tables of the Ohio report afford strict comparison of the cities of Ohio with one another, in respect to total receipts and expenditures and to specific items under each head, the total expenditures of Ohio cities, as a group or individually, cannot be compared with those of Massachusetts or New York cities for the reason that the receipts and expenditures for public schools are not given for any city in Ohio. Moreover, it would be useless to attempt to compare New York cities as a group with the cities of Massachusetts as a group, because the tables published by the Comptroller of the State of New York lack reports for 31 per cent. of the cities required by law to make report to him. The tables in the New York report, aside from their incompleteness due to the failure of the cities to conform to the law, are distinctly inferior in construction and arrangement to those contained in both of the other reports.

In the introductory portion of the New York document the Comptroller discusses, in a vigorous and pointed way, some of the reasons for the incompleteness of the statistics offered. Under the act of 1905, 57 counties, 42 cities, and 69 villages

(having a population of 3,000 or more) were required to file annual reports on forms prescribed by the Comptroller: only 39 counties, 29 cities, and 55 villages did so. "The attitude assumed by many fiscal officers in refusing or neglecting to file the required report necessitated the amendment of 1907 making such failure or neglect a misdemeanor," says the Comptroller. The Comptroller gives a list of four cities and eleven villages that "had exceeded the 10 per cent. limitation . . . and are consequently prohibited from incurring further bonded indebtedness save for purposes of water supply." He points out that most of the counties, cities, and villages received no income from interest upon deposits of public moneys.

The Comptroller's discussion of the disclosures made by his examiners relating to the confused accounts and illegal acts of the fiscal officials, in certain counties, is particularly illuminating. The Comptroller concludes that "the same general condition of negligent administration and wasteful extravagance appears to have existed in nearly all the county offices." It is clear that the Comptroller of the State of New York has a difficult problem to solve in his attempt to bring order out of chaos in county and municipal accounts and reports. His future reports will be looked for with interest.

Statistics relating to the salaries of municipal officials are rarely to be had. Therefore, Table IX. of the Ohio report, which is entitled "Statistics of Salaries, Wages, Taxation, and Improvements," is worthy of special mention. The following table showing the annual salary of certain principal officials of Ohio cities having 10,000 or more inhabitants in 1900 has been compiled from the table just mentioned. For the sake of comparison Table II. is followed by Table III., relating to the salaries of certain officials in certain cities of New York. It has been compiled from the Comptroller's Report on Municipal Accounts.

It is to be regretted that the States of Wyoming, North Dakota, and South Dakota, which have long exercised central control over municipal accounts and reports, do not publish reports similar to those considered in this article.

TABLE II.—SHOWING ANNUAL SALARIES IN 1906 IN CITIES OF OHIO HAVING 10,000 OR MORE INHABITANTS IN 1900.

	Population (1900).	Mayor.	Auditor.	Treasurer.	City Engineer.	Solicitor.	Chief of Police.
1. Cleveland . . .	381,768	\$6,000	\$5,000	\$4,500	\$4,000	\$5,000	\$4,000
2. Cincinnati . . .	325,902	6,000	5,000	3,500	6,000	5,000	6,000
3. Toledo	131,822	3,500	2,500	2,500	2,700	3,500	2,400
4. Columbus . . .	125,560	3,600	2,500	3,000	3,000	3,500	2,200
5. Dayton	85,333	3,000	2,400	2,400	2,700	4,000	2,500
6. Youngstown . .	44,885	3,500	2,000	2,000	2,500	2,000	2,000
7. Akron	42,728	3,000	1,500	500	1,800	2,000	1,500
8. Springfield . . .	38,253	1,500	1,800	500	2,000	2,400	1,500
9. Canton	30,667	3,000	1,600	1,200	1,500	2,000	1,200
10. Hamilton	23,914	*2,500	1,200	1,000	1,200	1,400	1,200
11. Zanesville . . .	23,538	1,500	1,800	600	1,500	1,500	1,080
12. Lima	21,723	*1,500	1,500	900	1,800	1,800	1,080
13. Sandusky	19,664	*1,500	1,500	1,000	1,400	1,200	1,200
14. Newark	18,157	1,200	1,200	400	1,200	1,500	900
15. Portsmouth . . .	17,870	1,500	1,500	600	1,200	600	1,200
16. Mansfield	17,640	†1,500	1,500	500	1,200	1,500	1,020
17. Findlay	17,613	900	1,200	500	1,200	1,000	900
18. East Liverpool .	16,485	1,800	1,200	600	2,000	1,000	1,200
19. Lorain	16,028	2,000	1,200	750	1,500	1,000	1,200
20. Steubenville . .	14,349	3,000	1,000	500	900	800	1,200
21. Marietta	13,348	800	1,000	300	‡4.50	900	900
22. Chillicothe . . .	12,976	†1,200	1,000	500	1,600	900	900
23. Ashtabula	12,949	1,100	1,000	500	1,200	900	1,200
24. Piqua	12,172	1,200	1,000	50	1,000	600	900
25. Massillon	11,944	1,500	800	400	1,200	600	900
26. Ironton	11,868	2,100	1,200	500	1,500	750	1,200
27. Marion	11,862	1,000	900	100	1,080	1,200	900
28. Tiffin	10,989	1,200	900	400	‡0.60	700	900

* Covers services as secretary of water-works.

† Retains fees in State cases.

‡ Per diem in Marietta; per hour in Tiffin.

TABLE III.—SHOWING ANNUAL SALARIES IN 1906 IN CERTAIN CITIES OF NEW YORK
HAVING 10,000 OR MORE INHABITANTS IN 1905.

	Population (1905).	Mayor.	Comptroller.	Treasurer or Chamberlain.	City Engineer.	Superintendent of Schools.
1. Rochester	181,666	\$5,000.00	\$3,500.00	\$3,000.00	\$4,500.00	\$5,000.00
2. Syracuse	117,503	4,000.00	3,500.00	3,000.00	3,500.00	4,000.00
3. Albany	98,374	4,000.00	3,500.00	3,000.00	3,500.00	3,000.00
4. Schenectady . . .	58,369	2,000.00	1,750.00	1,750.00	3,000.00	2,750.00
1. Elmira	34,692	1,750.00	?	2,333.33	1,800.00	1,750.00
2. Auburn	33,000	?	1,500.00	1,500.00	2,000.00	?
3. Niagara Falls . .	26,559	999.96	?	1,500.00	2,000.04	2,300.00
4. Newburg	26,498	800.00	?	500.00	?	2,000.00
5. Kingston	25,557	?	?	1,500.00	1,200.00	?
6. Poughkeepsie . .	25,379	500.00	?	1,500.00	1,000.00	2,500.00
7. Mount Vernon . .	25,006	999.96	1,999.96	999.96	1,599.96	?
8. Amsterdam . . .	23,943	?	?	1,200.00	1,800.00	3,000.00
9. Jamestown	22,892	500.00	1,200.00	1,200.00	1,500.00	?
10. Gloversville . . .	18,672	?	?	1,200.00	2,500.00	2,600.00
11. Lockport	17,552	600.00	?	1,800.00	1,200.00	?
12. Middletown . . .	15,682	300.00	?	200.00	900.00	?
13. Watervliet . . .	14,600	1,000.00	?	1,600.00	500.00	?
14. Corning	13,515	200.00	?	?	1,500.00	?
15. Hornell	13,259	200.00	?	1,200.00	1,200.00	?
16. Cortland	11,272	?	?	900.00	436.50	?
17. Hudson	10,290	500.00	?	1,200.00	1,800.00	2,200.00
18. Plattsburg	10,184	?	?	1,200.00	?	?
19. Rensselaer	10,175	600.00	?	1,200.00	500.00	?
20. North Tonawanda .	10,157	?	?	1,500.00	806.28	?

NOTE.—The first four are cities of the second and the remaining twenty of the third class.

REVIEWS AND NOTES.

The Book of Wheat. By Peter Tracy Dondlinger, Ph.D. New York, 1908. pp. 369.

While this book is not primarily a statistical treatise it contains such an abundance of valuable statistics on the subject treated and on the whole so admirably illustrates the advantages of the statistical method as an aid to clearness and accuracy in scientific exposition that there seems abundant justification for mentioning it in these publications. The author tells the story of wheat in such an interesting and at the same time instructive manner that one finds the book easy to read and at times almost fascinating.

The book is a mine of information, carefully arranged and well indexed. An exhaustive bibliography, filling twenty-seven pages in small type, makes the work an excellent guide to the investigator in any of the numerous branches of the subject. In his treatment the author has followed the natural order by first describing the grain and plant and the conditions under which it is grown, including soil, climate, methods of cultivation, etc., and then taking up in turn each stage through which it passes from producer to consumer. Numerous illustrations are introduced to show the historical development from the most primitive stages of the many tools, machines, and appliances employed in this great industry.

Many points are brought out in this book that are a revelation to the reader. We have been so impressed by the great advances made in manufacturing and transportation during and since the Industrial Revolution that we forget that agriculture has also been revolutionized, and that in no line of human activity has there been a greater lightening of human labor by the application of mechanical contrivances. One illustration will suffice to bring this home to the reader. In 1830 it required on the average 2 hours and 32 minutes of human labor to harvest and thresh a bushel of wheat, and in 1896 by the use of the combined harvester 5.6 minutes, while "the entire time of human labor necessary to produce a bushel of wheat, including sowing, reaping, and threshing, fell from 3 hours and 3 minutes in 1830 to 10 minutes in 1896." No step in the emancipation of human beings from the burden of brutalising toil has ever been more significant than this, for it must be remembered that the labor now performed is comparatively light and agreeable, call-

ing for intelligence and not mere physical endurance, and, furthermore, that it affords an ample reward in real wages.

The book will be found useful by farmers as well as students of economics, and is a welcome addition to a growing literature on practical economic subjects.

C. W. D.

NOTE ON THE POPULATION OF CHINA.

Many estimates have been made of the population of China, but until recently little of a definite or reliable nature has been known about the real numbers. There has been a growing feeling among statisticians, however, that most of the estimates are utterly unreliable, and that the figures usually given are unquestionably much too large. In view of the keen scientific interest in this question, as well as the practical importance that it has for the Western world, owing to the political and economic changes that have taken place during the past ten years in that part of Asia, it has seemed desirable to publish the latest available information in regard to this matter.

In the course of a somewhat extended correspondence with Professor W. F. Willcox, under date of Sept. 8, 1908, W. W. Rockhill, United States minister to China, makes the following observations, and submits the accompanying table in support of his views on this subject: "I am much pleased to learn that the conclusions reached by you concerning the probable population of China do not materially differ from mine. In fact, I think that they agree absolutely. According to my views, whatever the population of China was in 1842, it has not probably increased to any perceptible extent since then. I have shown that the estimates made by the Chinese, wherever Western observers have been able to look into them, should be reduced by half in many cases and in the others by, perhaps, a third. I know of no particular reason why the return of population made in 1812 should be preferred to any other, nor for that matter is there any reason for placing particular confidence in that of 1842. I have assumed that it was possibly in excess as much as 50 per cent. If I had to choose any one enumeration among those given in Chinese works, I would certainly take that of 1743 (see p. 663 of my pamphlet). I see no reason to believe that in the last half of the eighteenth century and the first half of the nineteenth there was no increase in the population of the Empire, though probably not a very large one. I think that a number of reasons might be adduced for believing that the population of China increased during that time, though that of Japan, as you say, remained stationary during that

period. Climatic as well as social and racial conditions, I think, are more favorable to an increase of population in the former than in the latter country. . . .

"The estimated population of China (including Southern Manchuria, or Shengking) is given in the 'Returns of Trade and Trade Reports, 1907,' published by the Statistical Department of the Imperial Maritime Customs (p. 40) as 438,214,000. I enclose this wildest of all estimates in case you have not seen it. The method followed in making such estimates is easily found out by comparing it with previous estimates. To show, however, the little value the Government of China put on these estimates of population, it may interest you to know that in July of this year the High Commission for the Collation of Administrative Methods and the Constitutional Commission, memorializing the Throne on the subject of the basis of representation in the Provincial Deliberative Assemblies to convene within a year, said, 'The Representation in the Provincial Deliberative Assemblies would best of all be arranged on a basis of population; but as China has not yet made a census, and as to take one now would consume too much time, the statistics of the literary examinations and the tax rolls have been taken as a basis for reckoning the number of assembly members to assign to each province.'

ESTIMATED CHINESE POPULATION OF THE SEVERAL PORTS AND OF THE
PREFECTURES AND PROVINCES IN WHICH THEY ARE SITUATED.*

Province.		Prefecture.		Port.	
Name.	Population.	Name.	Population.	Name.	Population.
Shengking . . .	16,000,000	{ Fenghuangting	332,000	{ Antung	22,000
		{ Fengtien (Mukden)	—	{ Tatungkou	5,000
Chihli	29,400,000	{ Yungping	—	Newchwang	74,000
Shantung . . .	38,000,000	{ Tientsin	—	Chinwangtao	5,000
Szechuan . . .	79,500,000†	Tengchow	4,500,000	Tientsin	800,000
Hunan	22,000,000	Chungking	5,123,000	Chefoo	100,000
		{ Changsha	—	Chungking	705,000
Hupeh	34,000,000	{ Yochow	270,000	Changsha	230,000
		{ Ichang	240,000	Yochow	20,000
Kiangsi	24,534,000	{ Kingchow	3,000,000	Ichang	55,000
		{ Hanyang	3,675,000	Shasi	85,000
Anhui	36,000,000	Kiukiang	1,752,000	Hankow	778,000
Kiangsu	23,980,000	Taiping	417,000	Kiukiang	36,000
		{ Kiangning	1,275,000	Wuhu	122,000
Chêkiang	11,800,000	{ Chinkiang	—	Nanking	267,000
		{ Sungkiang	—	Chinkiang	181,000
Fukien	20,000,000	Soochow	2,250,000	Shanghai	651,000
		{ Hangchow	750,000	Soochow	500,000
Kuangtung . . .	32,000,000	{ Ningpo	—	Hangchow	350,000
		{ Wenchow	2,073,000	Ningpo	260,000
Yunnan	8,000,000	{ Funing	900,000	Wenchow	80,000
		{ Foochow	3,400,000	Santuo	8,000
Other provinces (Shansi, Shensi, Kansu, Honan, Kweichow) . .	55,000,000	Chüanchow	2,200,000	Foochow	624,000
		{ Chaochow	—	Amoy	114,000
Total	438,214,000	{ Kwangchow	8,000,000	Swatow	67,000
		{ Kiungchow	60,000	Canton	900,000
		Limechow	500,000	Kongmoon	60,000
		{ Wuchow	400,000	Samchui	6,000
		{ Nanning	620,000	Kiungchow	40,000
		Taiping	300,000	Pakhoi	20,000
		{ Linan	450,000	Wuchow	59,000
		{ Puerh	50,000	Nanning	40,000
		Yungchang	700,000	Lungchow	12,000
				Mengtse	18,000
				Szemaio	15,000
				Tengyueh	10,000

* 'Returns of Trade and Trade Reports,' Imperial Maritime Customs, 1907.

† Estimated by Sir A. Hoise (1904) at 45,000,000.

"Nothing has been done in the last few years, since the administrative reform of the Empire has begun, looking to the ascertainment of the population of the Empire. A few counts of the population of certain cities have been made. Though in all likelihood inaccurate, they are of considerable interest in view of the paucity of data we possess. In the early part of last year the Ministry of Domestic Affairs or Home Office (*Min-cheng Pu*) reported that the number of families in Peking was 123,790. Taking as an average per household of 5.5 head, it gives 680,845, which, I think, is a pretty close approximation to the truth. A census was also made in 1907 of the city of Swatow. The result is curious. It is 21,782 males and 5,185 females, children included, living in 4,875 homes (5.4 head per home). In the case of the city of Mukden an official count of the population was made in 1907. It gave 158,132, of which three-fifths were males.

"As bearing on the subject generally, it is of interest to note that in August, 1907, the Japanese authorities in Korea had a census made of the people. It gave 2,233,087 houses with a population of 10,381,680,—4.15 heads to the home.

"At the present time another census of Peking is being taken. I am endeavoring to ascertain the method followed, and will let you know concerning it. . . .

"I shall be very glad at any time if I can be of any assistance whatever in any researches you may wish to make concerning the population of China or Eastern Asia, which is, as you say, an unsolved problem of very great interest and importance."

Writing about a month later, Mr. Rockhill submits the following table, and says in regard to it: "Since writing you last month, the Chinese 'Government Official Gazette' has published a census taken this year of the population of Peking, exclusive of suburbs. The 'family,' I think, should be counted at 5.5 heads, though some persons I have recently consulted think it may be, in the case of Peking, as high as 8.0. In view of the excessive infantile mortality here (some European medical men I have spoken to say it is probably as high as 50 per cent.), I think 5.5 is a fair average. This gives us 693,044 persons. Sacharoff gave the population of Peking within the walls, in 1845, as 1,648,814,—a figure probably 50 per cent. in excess of the truth."

CENSUS OF FAMILIES IN PEKING.

COMPILED BY ORDER OF THE BOARD OF INTERIOR AFTER THE DIVISION INTO THE PRESENT
POLICE DISTRICTS.(Translated from *Cheng Chih Kuan* Pac of Sept. 1, 1908.)

Precincts.	Districts.	Principal Families.	Additional Families.	Total Families.
Central Precinct of the Inner City .	First	1,873	1,658	3,531
	Second	1,637	1,136	2,773
	Third	1,160	940	2,100
East Precinct of the Inner City . .	First	2,453	1,662	4,115
	Second	5,132	3,164	8,296
	Third	3,839	3,189	7,028
	Fourth	5,831	4,014	9,845
	Fifth	3,891	3,545	7,436
West Precinct of the Inner City . .	First	3,864	2,372	6,236
	Second	4,773	3,391	8,164
	Third	3,428	2,362	5,790
	Fourth	4,185	2,970	7,155
	Fifth	3,254	2,786	6,040
East Precinct of the Outer City . .	First	3,288	2,137	5,425
	Second	2,660	2,390	5,050
	Third	2,024	2,754	4,778
	Fourth	796	762	1,558
	Fifth	2,328	3,528	5,856
West Precinct of the Outer City . .	First	2,983	2,139	5,122
	Second	3,382	1,779	5,161
	Third	2,162	2,369	4,531
	Fourth	2,596	1,969	4,565
	Fifth	2,040	2,913	4,953
Total Inner and Outer Cities		59,579	56,429	126,008
Total in Tartar City				79,009
Total in Chinese City				46,999
Total number of persons at 5.5 per family				693,044

Mr. Rockhill also enclosed an official statement of School Statistics for the City of Peking. The table is too long to reproduce in its entirety, but it seems worth while to give the summary for the whole city, though it does not bear directly upon the question under discussion. Total of the Inner and Outer Cities:—

Boys' schools	183
Girls' schools	17
Scholars, boys	16,282
Scholars, girls	771
Teachers, men	1,200
Teachers, women	100
School officers, men	199
School officers, women	16

It would appear from these figures that the schools of Peking are not overcrowded and that the teachers are not overworked. This table is certainly a sad commentary on the condition of education in China, even if the population of Peking is only 693,044, as Mr. Rockhill states, rather than the million and one-half or more ordinarily given.

C. W. D.

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STATE PENSIONS AND ANNUITIES IN OLD AGE.

BY FREDERICK L. HOFFMAN.

State pensions in old age are being widely discussed in this country, and foreign experiments and results are cited to prove that in Massachusetts, New York, and other states, the time has come for a more systematic financial provision for support in old age. While the literature of the subject is considerable, there is no consensus of qualified opinion as to the best policy which should be adopted to carry into effect so far-reaching a scheme of radical social reform. In essence the whole problem is one of taxation, for, however much the facts may be obscured by sentimental utterances, the money necessary for any additional public support of the aged must be raised by taxation, since there are no other sources of income available to the state. Mr. William H. Lecky has very properly called attention to the fact, in one of his last contributions to English literature, that "there is a marked and increasing tendency to meet all the various exigencies of society, as they arise, by state aid, resting on compulsory taxation," and with equal clearness he has stated some of the first principles of old age pension agitation, as follows: "I can hardly conceive anything more certain to discourage thrift and to sap the robust qualities of the English people, than that the belief should grow up among the whole working population, including the most industrious, the most respectable, and the most independent, that they should look forward to the state, and not to their own exertions, to support them in their old age." In reply it is ar-

gued, by a decidedly influential group of statesmen and writers, that in spite of half a century of rising wages and cheapening supplies it is impossible for a large proportion of the poor, through their present wage-earning opportunities, to avoid falling upon charity during sickness and old age. But arguments like the foregoing take it for granted that the economic and industrial opportunities of the nation are being utilized to their fullest extent, ignoring the palpable truth that, on the one hand, industrial efficiency with the mass of mankind is still of a low order, while it is only of very late years that the waste products of industry have been utilized to advantage. In a democracy, charity of any kind should ever be the last hope held out as an alternative to secure to each man a fair degree of economic well-being. Arguments that no possible thrift among wage-earners will enable them to make a sufficient provision for family support or for old age are admissible only when the evidence is supplied that family incomes at the present time are utilized to the best advantage. State aid, for any purpose, in a democracy should be the last rather than the first resort in efforts to solve problems of poverty and dependence, and most so in the perplexing question of invalidity and old age,—a question which has attracted attention on this side of the Atlantic, largely because of our tendency to follow European suggestions and imitate European methods of government and social reform. When the arguments which are made in behalf of state pensions in old age are subjected to critical analysis even including those made by the foremost English statesmen of the period, they fall lamentably short of meeting the requirement that such arguments should rest upon an indisputable basis of accurate facts. Mr. Charles Booth and his coterie of followers make a great deal of the existing amount of poverty in old age, but they make very little of the causes primarily and chiefly responsible for that poverty and dependence which are, on the one hand, the result of misgovernment and, on the other, the result of misspent lives. There is nothing easier in the world than to gain public consent to measures in behalf of the distressingly poor, or the suffering portion of

mankind, by calling attention to their poverty and their suffering, *and to nothing else*. Even at the most, only about one-third of the very aged in England are in poorhouses or in receipt of outdoor relief, and, to further help these, it is proposed to ignore the other two-thirds, who by prudent living, self-sacrifice and self-denial, have some way or somehow managed to maintain themselves. Far more important, it would seem to me, is the question how the other two-thirds have managed to provide for themselves, than how it happens that one-third of the aged should be dependent absolutely upon state aid in the last few years of their lives. It would seem to me that far more useful lessons could be learned from well-spent lives than from ill-spent lives, and it is pertinent to ask, first of all, what the actual facts are regarding dependent poverty in old age among any portion or part of the population of the United States.

Among the various proposals which have been made for state pensions in this country, the most suggestive, because the most drastic, would seem to be that of the Rev. Edward Everett Hale. Following the precedent set by distinguished clergymen in England, who have discussed the subject, and from practically the same point of view, Mr. Hale concerns himself largely with the sentimental aspects of poverty, while ignoring almost entirely both the statistics and economics of so important a question affecting the welfare of *all* the people of the state. "Simply speaking," argues Mr. Hale, "the payment of one hundred dollars to males and females who have passed the age of seventy does not involve a heavy burden to the state."* No data are supplied as to what the cost would actually be, or as to the numbers of those who would require to be supported by the state at this rate out of the public funds. Now the estimated number of persons aged seventy and over in the state of Massachusetts is about ninety-six thousand, which at one hundred dollars each would involve an annual expenditure of about ten million dollars, exclusive of the expenses of the necessary administration. Deducting from this number whatever proportion may be considered as outside of the pensionable

* "Old Age Pensions," by Edward Everett Hale, p. 9; see also *Charities and the Commons*, June 1, 1907, page 275 *et seq.*

class, there still would remain a very considerable remnant, which would impose a burden upon the tax-payers, of which they would not be very likely to speak as *a simple matter* to themselves. Mr. Hale arrives at a curious conclusion, holding that, "if we pay one hundred dollars to every citizen, man and woman, over 69 years of age, we should have to pay about \$125,000,"* when, in fact, upon a minimum calculation, the cost of a state pension scheme in Massachusetts, at one hundred dollars a year, and beginning with age seventy, and paid to only 40 per cent. of the aged, would certainly be not less than four million dollars per annum.

The question of providing systematically and adequately for the aged poor is not quite so simple a matter as it is generally assumed to be by those who have done most to draw public attention to the subject. There are some decidedly perplexing elements in the question, to which not even the elaborate and well-nigh exhaustive investigations of various royal commissions and committees in England and other countries furnish a conclusive or sufficient answer. Considering the far-reaching moral, social, and economic consequences which in logical sequence must follow any ill-reasoned policy of state support in old age, it would seem of the first importance that no step in this direction should be taken which is not in strict conformity to the methods by which real and enduring social and political progress has been achieved in other directions. Nothing is more difficult than to develop right conceptions of property and social justice, and nothing has been slower in the progress of mankind. Nothing is more seductive than to achieve political ends and purposes by the increased taxation of those who *have* for the benefit of those who *have not*, but all history sustains the conclusion that such a policy is fatuous, and, like the old English Poor Law, inevitably leads to ruin.† However difficult or slow social advancement in any given direction may be, ill-considered revolutionary methods will tend to hinder rather

* "Old Age Pensions," by Edward Everett Hale, p. 8.

† For an admirable discussion of the economic and social consequences of the English Poor Law, see "The English Poor," by Thomas Mackay, London, 1889; also "Methods of Social Reform," by the same writer, London, 1896.

than to help. The problem of poverty is not, and never in the history of mankind has been, solved by gratuities, doles, pensions, or philanthropic enterprises, and it never will be. These are mere Morrison pills, as Carlyle would say, used to deceive the ignorant, but not preventives which will make poverty and dependence of a lesser degree of frequency than is at present the case. Far better would it be for the social reformer to study the methods of sanitary research, which by removing the causes and conditions favoring ill-health, have immeasurably benefited mankind by a reduction in the mortality from preventable diseases throughout practically the entire world. Far more practical and useful would be research to determine why, on the one hand, there is as much poverty as we actually observe, and why, on the other, there is so much less poverty in some sections of our country than in others. A non-contributory old age pension scheme will not solve the problem of the dependent poor and will not prevent an increase in the burden of real pauperism; but, on the contrary, it will undermine and tend to destroy the self-respecting character of our people as citizens in a democracy where economic independence, achieved by individual effort, self-sacrifice, and self-denial, is, after all, the only aim and end worth while.

However much we may be inclined to permit ourselves to be deceived by specious arguments of guesswork philanthropy into believing that the gift is to help the recipient and not to hinder, such gifts, with rare exceptions, are opposed to the principles of character building and of character maintenance throughout *all* the years which constitute the span of human life. In fact and in truth, the very term "pension" is a fiction, devised to disguise poor-relief in its most insidious form and applied to a group which because of old age and a more or less helpless condition appeals powerfully to the sympathies of all intelligent mankind. But it is just because of this fact of dependence in old age that the vast majority of the thrifty and industrious members of society are encouraged, or induced, or practically compelled, to exert themselves to the utmost, to achieve by their own effort a modest degree of financial inde-

pendence for the comparatively few declining years of life. Hold out the prospect that such effort is not necessary, that earnings may be squandered for a thousand and one needless purposes, that restraint upon family expenditures is not required, and the most powerful incentive which makes for character and growth in a democracy is taken away.

The argument is advanced that such pensions are really not fundamentally different from the pensions paid to soldiers and sailors for service rendered the nation in times of peace or war, or to civil service employees of all kinds, who are retired on attaining a given age; for it is said, if the state considers it just to pension our fighters, why should she not also pension workers? and, in the Australian proposals for a government pension scheme for the entire Commonwealth, it is laid down as a distinct proposition that "old age pensions are to be granted as a right and not as a charity."* It is overlooked that the state pays pensions for exceptional services rendered which, by general standards of remuneration, were inadequately paid for at the time the duties were performed. A well-governed state exacts the best years and the best efforts of a man's life, and that only during the years of maximum efficiency. No workingman, even at common labor, works as cheaply, all things considered, and certainly as regards his own personal interest, as the private who serves in behalf of the national defence at home and abroad. To deny to such a man a pension in old age, when by the very fact of his service he has become totally incapacitated to earn his living in industry or trade, would be rank injustice, on the one hand, and the most serious detriment to the national service, on the other. The case is very different with men who have followed their own ends and served their own purposes, who have made their struggle for success, and who, because of misapplied energy or misapplied talent or because, more likely, of misspent years, are dependent upon charity in their old age. The more than thirty millions of men and women employed in the industries of this country are not working for the state or for the nation, but they are working for themselves,

* Report of the Royal Commission on Old Age Pensions of the Commonwealth of Australia, 1906.

and they have unrestrained control over the expenditure of their incomes, and, to that extent, they have their future fate and fortune in their own hands. These are the workers of the nation, but not the workers *for* the nation, and the difference is fundamental and ought never to be lost sight of in discussions of this kind. If the workers of the nation have not been adequately compensated for their services, if, even in spite of the most determined efforts of organized labor, the rate of wages has not been increased to the extent that would be so manifestly desirable, it is either because the method of remuneration is decidedly at fault and requires to be corrected or because the efficiency of the average workman is very far from what perhaps it might be under a more effective and practical method of industrial and general education and a rational development of human faculty. If any considerable proportion of the earnings of labor are withheld from them to be used in the form of forced taxation, which is all it amounts to, to provide funds for pension payments in old age, common justice demands that this difference shall be paid to the workman while he renders service, for it belongs to him at that time, and to him alone.

If it is true that even under the present conditions of material well-being in this country but a comparatively small proportion of wage-earners have more than a week's wages ahead of them, so much greater is the need that there should be rational education in household economy, or in wage expenditures, or in the cost of rational living, and the best possible methods of investing surplus earnings for future betterment and independence throughout *every* year of the workingman's life. If it is true that the vast majority of our wage-earners are not exerting themselves to the extent of making the most of life, to the combined advantage of themselves and the community, then more practical education in the industrial arts is the paramount duty, far transcending in importance the sentimental considerations of the needs of the dependent poor in their old age.*

* This is denied by Dr. R. van der Borcht, who, in his treatise on the social importance of German workmen's insurance (Jena, 1898), argues that an increase in wages would not lead to a higher degree of economic independence, but rather to the satisfaction of wants and desires not connected with a voluntary systematic provision for old age (p. 16).

What would seem to be most needed at the present time is a clearer conception of the duty of efficient work, on the one hand, and of full compensation for service rendered, on the other. It is necessary to recognize the fundamental principle of rational industry, that only the *service* rendered should be paid for, and not the time spent or wasted while being on the pay-roll. To instruct the mass of mankind in clear conceptions of individual duty and to point out rational ideals, such as the attainment by self-effort of industrial independence in middle life and old age, is difficult enough, but all these efforts will be in vain the day when universal old age pensions become the law of the land. It is true enough that the amounts at best will ever be comparatively small, but never will efforts cease to lower the pensionable age and to increase the amount of the pension to be paid. If state pensions are adopted, there will come into existence a new standard of life and living opposed to the teaching of the past,—a standard which separates clearly the man who *has not* done his duty, but who will be rewarded by the state, from the man who *has* done his duty within the limits of his means, and who in his old age will not be better off than the one who has lived most of his years contrary to the best interests of the community as a whole. To fix the amount of income and property which a man must possess as a discrimination in awarding the pensions is but another attempt to establish an average standard of living as the ideal to be aimed at by the mass of mankind in return for a modest, but certain, support in old age. We are still too near to our barbarian ancestors to trifle with the foundation of our character in so reckless and ill-advised a manner as this. It may seem like uttering commonplace verities, but, if so, there is need of plain speaking and of clear thinking at a time when, even in such countries as England, New Zealand, and Massachusetts, the traditional conceptions of character and citizenship are at the risk of being replaced by a doubtful doctrine of social and political expediency.

An almost endless variety of old age pension plans have been suggested and quite a number of the various propositions

have been seriously considered by Parliamentary committees in England and Australia and by experts in insurance and actuarial science. For all practical purposes, the demand of the present day is, however, for old age pensions without special qualifications, and non-contributory on the part of the beneficiaries. The earlier and well-founded objections to the proposals of Mr. Charles Booth for universal old age pensions have been set aside, and there is little chance, in this country at least, for the adoption of any pension system after the German method of exacting joint contributions from the beneficiaries, the employers of labor, and the state. The recent English act providing for old age pensions of five shillings a week, beginning with age seventy, applies to a very large proportion of the population, and there is no doubt that the number of the disqualified will in course of time be materially reduced. There is also little doubt, judging by the widespread dissatisfaction, that the age will be lowered at least to sixty-five and that the amounts will be increased to seven shillings a week. In the words of a Labor Committee of Dundee, they have no use for pensions "payable when they are dead." However difficult the fiscal problem may be, poor-law history will repeat itself, and, for political reasons, if for no other, in course of time the insistent demand for more will be complied with, even though it be to the serious injury of the thrifty and useful elements of the population.

In Australia, with economic conditions quite similar to our own, old age pension systems have been introduced in several colonies, and it is now seriously proposed to introduce state pensions in the Commonwealth. In New Zealand,* where at the outset the pension was fixed at seven shillings a week, it has, under the amended act, been raised to ten shillings, the same as in New South Wales. In Victoria, however, the pension remains at eight shillings, at least for the time. In the three colonies combined there are nearly 50,000 old age pensioners, who receive from the public revenues over \$5,000,000 per annum,

* For an extended discussion of the universal old age pension system of New Zealand, see my article in the *Spectator*, a New York insurance periodical, for April 27, 1905.

while, as far as the official statistics enable one to pass judgment upon so complex a matter as poor-law expenditures, there has been little, if any, material reduction in the cost of indoor and outdoor relief. But, even if there has been a shifting of the expenditure, the real problem of labor and poor-law reform will not have been solved, and that is the reduction of public relief *in any form* to a minimum and to the unquestionable advantage of the people at large.

There is, in fact, some very suggestive evidence to the effect that the amounts expended for charities have not been materially reduced since the introduction of old age pension systems, at least in New South Wales and Victoria; for in the report of the Australian Royal Commission on old age pensions it is stated that "the amounts voted for charities by the governments of New South Wales and Victoria, where old age pension acts are in existence, have not been appreciably reduced in consequence of the passing of those acts." To this significant statement the Commission adds the following pregnant sentence: "It is stated by witnesses that the old age pension acts have provided almost entirely for a different class of persons," and, further, that "it has been shown that in numerous cases the granting of pensions, with the consequent removal of inmates from asylums, has been exceedingly harmful, in that many of them have drifted into most undesirable quarters and suffered neglect and privation."

The miscalculations of anticipated results were not the only serious errors made by those responsible for the introduction of a system of old age pensions into that Commonwealth. The original estimate by Sir George Turner, that there would not be more than six thousand applicants for pensions in New South Wales, was proved by experience to have been astray to the extent that eleven thousand pensions had been granted soon after the passage of the act, without exhausting the number entitled to the benefits conceded as a right. As a result, the colony was placed under a very large additional burden, which had to be incurred as a matter of public policy, to prevent the colony from breaking faith with those to whom the pensions

had been promised. In fact, instead of the anticipated six thousand pensioners, the actual number by 1902 was nearly fourteen thousand, and by 1907 it was 21,465. Of the total number estimated to be living at ages sixty-five and over in New South Wales, 40 per cent. had availed themselves of the *right* to pensions in old age!*

There are no valid reasons to believe that the proportion of population in this country which would take advantage of old age pensions offered as a right would be less than 40 per cent., and in all probability it would be more. We have certainly had sufficient experience in our military pension legislation to warn conservative and disinterested statesmen of the possible consequences following an initial step in the direction of providing pensions in general for the aged. All calculations, actuarial or otherwise, which may be submitted, are likely to prove of very limited value where demands of political expediency are opposed to disinterested scientific and economic considerations. But, as an aid toward a better understanding of the financial aspects of the problem, I present in detail a few calculations which may prove of interest and value to those to whom this matter is one of serious concern.

In 1905 the population of Massachusetts, aged sixty-five and over, was 154,000, and, assuming a normal rate of increase, the number for 1909 may be estimated at 162,000. On a minimum basis of ten shillings a week, according to the New Zealand standard, or \$2.50 a week, the annual cost to the state would be over \$21,000,000, if all were entitled to a pension of this amount, while, if 50 per cent. were eligible, the annual cost to

* The *Philadelphia Inquirer* of March 11, 1909, comments editorially upon the recent English old age pensions in part as follows:—

"It is not the least surprising that the operation of the old age pension law in the United Kingdom is proving a source of great embarrassment to the government responsible for its enactment. Seldom has a measure of such immense importance been so improvidently passed. Its introduction ought to have been preceded by a thorough study of the whole subject in all its phases, and each of its clauses should have been subjected to an exhaustive debate. . . . They just went ahead regardless of consequences and heedless of example, and took a leap in the dark which will land them no one yet knows where.

. . . "It is stated that the amount required to pay the pensions authorized is about eighty per cent. more than had been estimated, and some curious people want to know how it happens that in Ireland, where only 152,000 eligible pensioners are to be found, as many as 177,000 pensions have been authorized. It is an interesting situation which may have sensational developments."

the state would be over \$10,500,000. Of course, if the pension is made less, the cost would be less, and, if the pension is raised, for illustration, to \$3 a week, and, if 50 per cent. only received this amount, the annual cost would be not far from \$13,000,000. Quite a reduction, of course, would be possible if the pensionable age were fixed at seventy, and in that case, at the rate of \$2.50 a week, and on the assumption that only one-half of the number living would be entitled to a pension, the cost would be about \$6,500,000 per annum. In contrast, if the pensionable age were fixed at sixty, and on the same assumption of 50 per cent. participating in the benefit, the annual cost to the state would be nearly \$17,000,000. These figures certainly furnish food for reflection, and they present the problem without the slightest attempt at exaggeration, with a probable underestimate of the cost, which, of course, is exclusive of the administrative expense necessary to carry such a scheme into effect.

The cost of administration might be very considerable, although it need not assume the proportions experienced in New South Wales. It was estimated by the Royal Commission that in Australia, with an estimated population of 168,000 aged sixty-five and over, of which approximately 67,200 would be pensioners, the expense of administration would be, approximately, 2 per cent. of the pension payments. In England it has been assumed that the cost of administration would not be less than 3 per cent. By a curious coincidence the aged population of New South Wales is almost the same as that of Massachusetts, but on account of differences in social and economic conditions it is quite probable that the proportion who would avail themselves of an old age pension in Massachusetts, conferred as a right and not as a privilege, would not be less than 50 per cent. of those whose ages are above the pensionable period.

But there are many other aspects of this problem which the advocates of state pensions are apt to overlook. Among other contingencies is the practical certainty that, once the demand for old age pensions is heeded, it will be followed shortly

by a still more insistent demand for pension payments in the event of invalidity and resulting incapacity for work. Granting as a matter of political expediency the *right* to a pension on account of old age as an inevitable circumstance of life, how can the corresponding right to a pension in the event of invalidity or incapacity for work be consistently denied to those who, in a measure, constitute an even more unfortunate and equally deserving element of the adult population. Now, invalidity and incapacity for work include every year of life in industry, and, beginning with age twenty, the German statistics for 1900 show that 7 per cent. of those pensionable for invalidity were under thirty years of age, 47 per cent. were of the ages thirty to fifty-nine, and only 46 per cent. were sixty years of age and over. In 1900 the amount paid out in invalidity pensions was 121,000,000 marks, while the amount paid out for old age pensions was not quite 18,500,000 marks. In 1906 the number compensated on account of old age was 10,666, on account of permanent invalidity 110,969, and on account of provisional invalidity 12,421,—a total of 134,056 persons compensated under the invalidity and old age pension laws, out of a total of about fourteen million insured. The average amount of pension payments has increased in the case of invalidity pensions from 113.5 marks in 1891 to 162.9 marks in 1906, and in the case of old age pensions from 124 to 161 marks!

Another serious aspect of the problem which demands consideration is the probable future increase in the average duration of adult life, and, in exact proportion as sanitary reforms combine to lengthen the span of life beyond sixty-five years, the economic difficulties of the old age pension problem will increase on account of the larger proportion of the population to be provided with old age pensions.* Measures and means for the pre-

* Among other illustrations of the fact that annuitants usually live beyond the normal expectation, reference may be made to the records of the Friendly Society of Iron Founders in England, which has been paying pensions for many years to its superannuated members. In 1883-85 it was found that the average age of these pensioners at death was fifty-eight years and six months, but during the years 1906-07 the average age at death had increased to seventy-one years and three months. While such results may not be entirely conclusive, they are in conformity to the general experience that annuitants and pensioners live longer than those who are not systematically and adequately provided for in their old age.

vention of disease, and the diminution of industrial accidents, so desirable otherwise, will tend to enhance the financial difficulties of a pension grant in old age conceded as a right and applicable to certainly not less than one-half of the population. But difficulties like these are made light of or they are often entirely ignored by the enthusiastic advocates of state pensions, who insist that the state shall do that for wage-earners which it is rather the duty of the state to require, as a prerequisite of good citizenship, of each man to do for himself. I cannot do better than repeat here the words of warning from one of the most sympathetic students of the life of the poor, and I quote from Helen Bosanquet's book on "*The Strength of the People*"* the following suggestive remarks:

"Old age is a definite and admitted part of the life of man, and to introduce dependence into it is to break down the interest of maintaining independence intact quite as definitely as to introduce it into any other part of the life. And it is likely to have the same consequences. With the interest of independence gone, and the habit of looking to external aid introduced, the economic loss is not likely to be limited merely to the amount of subsidy itself. It will affect the whole attitude of the mind toward the problems of life. If a man is to be maintained from irrelevant sources during the helplessness of illness, why not at every other point in life when his economic position becomes difficult?"

It seems hardly necessary to more than refer at this time to the German compulsory system of providing pensions in invalidity and old age, but while, apparently, such a system is quite out of the question in this country, it is frequently referred to as a practical solution by those who are most enthusiastically in favor of the introduction of so-called "labor insurance" into the different states of this country. I say in all seriousness that I do not know of any one who has thoroughly grasped the subject of German government insurance in its social and economic aspects and seemingly endless ramifications. The literature of the subject is immense, together with a wealth of statistical

* "*The Strength of the People*, by Helen Bosanquet, a Study in Social Economics," published by the Macmillan Company, London, 1902. See also, by the same writer, "*The Family*," published by the Macmillan Company, London, 1906.

material, but, notwithstanding all this, no final answer has been made to the question whether the German system, as a social institution, is in reality serving the best interests of the German nation. It is still an open question whether government insurance has really strengthened German industrial effort in its active competition in the struggle for international commercial supremacy, and I am not convinced that the introduction of the system has brought to the German nation the peace and content of the working classes, which was the chief contemplated result, as a much-to-be-desired antithesis of socialism. There is certainly a very considerable amount of complaint of the shortcomings of the system, including bitter criticism of its administrative complexity and cost. In the mean time the socialists have gained in strength rather than lost ground, although the agitation may be said to have broadened and become more rational and practical, as might naturally have been expected in any event.

I may here refer briefly to a recent discussion of the subject of old age annuities in the Canadian Senate and published as a Parliamentary Paper in 1907.* In his introductory speech the Right Honorable Sir Richard Cartwright, Minister of Finance, referred to a bill which had been submitted for consideration, authorizing the issue of government annuities for old age. The bill provided for practically the same system of old age annuities which have been sold through the British Post-office for many years, but which have never become a practical success. The Canadian proposition was to limit the amount of such annuities to \$400 a year as a maximum, and in case of the previous death of an annuitant all moneys paid by him in consideration of such annuity were required to be paid to the heirs or legal representatives, with interest thereon at the rate of 3 per cent. In anticipation of a possible deficit in the administration of the act upon the rates proposed, the Minister of Finance and Receiver-General was to be given authority to transfer the amount of such deficiency out of the consolidated revenue fund for the

* The Canadian act establishing a system of government annuities became effective on July 20, 1908.

purpose of paying claims for such amounts. The Minister, in advocating government annuities, expressed decided views adverse to old age pensions, stating it as his opinion that in a great many cases such a scheme would be found to encourage extravagance, and that the result would be that the thrifty industrial workingman would find himself compelled ultimately to bear the burden of his less industrious and possibly dissolute companions. While thus strongly opposed to old age pensions as a gift, the Minister nevertheless favored a method of government annuities at rates which would involve, in all probability, a loss to the Commonwealth, and the difference in cost would, of course, represent as much a gift, or gratuity, as an old age pension, although less objectionable and less expensive to the state. Even under these conditions, however, the Minister admitted that the terms would not be very much better than could be given by an ordinary insurance company, with which he believed there would be no interference, since he thought that those who would make use of one method would not make use of the other. His statement, made at the time, that there were practically no annuities now being taken out in Canada, was contradicted, by reference to the government Blue Books, which showed that during 1907 Canadian life insurance companies paid to annuitants the sum of \$254,000. The Minister might also have referred to the unsatisfactory results secured with deferred annuities in England, and he might have quoted from the last report of the Postmaster-General the statement that during 1906 only 142 of such annuities were sold through the many thousands of post-offices of the United Kingdom. After more than forty-one years' experience of government post-office annuities only 2,850 deferred annuities were in force on Dec. 31, 1906, regardless of the special attraction offered to intending purchasers of possibly superior government security in competition with private insurance companies.*

Much might be said here in favor of voluntary insurance with payments terminating at age sixty or sixty-five, when the active lifetime of wage-earners, at least, has practically come to

* For details and tables of premium rates, see statistical appendix.

an end. An immense amount of good is certainly accomplished by this method, which is probably the most effective form of systematic savings that has been devised by the ingenuity of man. Old age annuities are, no doubt, desirable, but in the case of the married they should provide for the return of the payments made, with reasonable interest, in the event of previous death. The cost of such an annuity, of say \$2.50 a week, commencing with age sixty-five, is not at all prohibitive, and, combined with life insurance, provides a most attractive method of providing for old age. In the evolution of the life insurance business new plans are being devised, and among other recent developments is a method by which a definite sum of at least \$10 a month can be secured by comparatively small payments on the Non-participating plan, when taken out early in life. For illustration, at age twenty it would cost, on the Whole Life plan, \$26.24 per annum to provide \$10 a month for twenty years for surviving members of the family, in the event of the death of the insured. To provide self-support in old age for twenty years following age sixty-five, and family support for twenty years in the event of previous death, would cost \$30.78 per annum, if the insurance were taken out at age twenty. These are illustrations of what can be done, and what happily is being done, by a very large number of thrifty men and women throughout the United States at the present time.*

It would seem that we may very seriously go astray in over-emphasizing the suffering and hardships of dependent old age, and by overlooking the far more important fact that needless suffering and hardship during the productive period of life implies a far greater economic disadvantage than has been brought out thus far by researches into the subject. The proportion living at ages sixty-five and over of the total population of all ages is only about 4.1 per cent., but in Massachusetts this proportion is somewhat larger, being about 5.1 per cent. I say *about* advisedly, because there is always a considerable degree of error involved in the returns of advanced age, and, in the event of old age pensions being granted as a right,

* For details and tables of premium rates, see statistical appendix.

there would, no doubt, be an increase in the recorded numbers living above the age of sixty-five, or whatever other age might be adopted as the beginning of the pensionable period. During the intervening years of an active industrial life, that is, from fifteen to sixty-four, approximately one-half of those living die, leaving, in a large number of cases, dependent survivors, for whom, it is needless to say, it is equally important, if not even more so, that some definite financial provision should be made. To this group, largely consisting of women and children, for which, by the way, not even the German government, with all its ingenuity, has thus far been able to provide, voluntary thrift in this and other countries, through the medium of life insurance, is securing an ever-increasing amount of protection, practically as secure and safe as any government guarantee could make it.

Objections are often raised by wage-earners against payments on account of deferred annuities, beginning with age sixty-five or seventy, which have their origin in the intuitive perception that only a comparatively small proportion will, in any event, attain to real old age. Immediately before their eyes and ever present in their minds is the thought and conviction that some substantial provision must be made for those who, through marriage, have become an immediate responsibility to the head of the family as wives, children, or relatives, and who, in the event of the breadwinner's death, may become and probably would become public charges. To secure those nearest and dearest against the possible contingency of dependence upon the state, life insurance is the recourse of an ever-increasing proportion of wage-earners, including a class working at wages not much above the lowest limit of subsistence. They make the apparently impossible possible by careful economy, by prudent self-denial, by the rational expenditure of every dollar and even of every cent. An infinite amount of further progress might be made in this direction if more rational education in matters of this kind formed a part of the curriculum of our public schools. Rather than to delude the masses by hopes of an easy old age, at a few dollars a week, the state

can render no better service than by inculcating the highest possible ideals of right living in the young by emphasizing the need for the rational expenditure of wages as they are earned. The state may even go further, and educate the young in sound methods of investment, savings, and insurance to the extent that the adult minds will be more critical, more competent, and less liable to being led astray by the innumerable schemes by which the poor are robbed of their substance under the flimsy pretence of exceptionally large returns. The state might go still further and carry out the real function for which all government exists; that is, to administer the most rigorous form of justice to those who prey upon the poor in some form or other and who induce the masses to fritter away their earnings and savings in the innumerable schemes which are permitted with the apparent sanction of law to make the few rich at the expense of the helpless many. When government discharges its full duty in this respect, government need not concern itself with delusive schemes of old age pensions for the poor.

Dr. Hale has proposed to raise the sums required by a poll tax, which in Massachusetts is \$2 a year, and which applied to the entire male population at ages eighteen and over would produce a trifle over two million dollars a year. Since the cost of a pension scheme of at least \$100 a year, commencing at age sixty-five and applicable to one-half of the population living at this age, would be over eight million dollars, even under the most favorable conditions the poll tax would not produce much more than one-fourth of the sum required to carry any practical system of old age pensions into effect in this state.

Another proposition, which was made in Australia and which may here be referred to because it is likely to attract considerable attention, was a tax on wages, which, it was estimated, would produce about two million dollars a year.* I have made some calculations for the entire United States along somewhat similar lines; but, unfortunately, really conclusive statistical information

* For an extended discussion of a wage tax to produce the amount necessary for an adequate state pension system, reference should be had to the evidence appended to the Report of the Royal Commission on Old Age Pensions of the Commonwealth of Australia, 1906.

is wanting, and only an approximate estimate is possible on the basis of the salaries and wages earned by nearly six million persons employed in manufacturing industries, averaging almost exactly \$600 a year. Reducing this amount to \$360 a year on account of the lower cash earnings of farmers and agricultural laborers, I find that, estimating the number of men and women employed in gainful occupations during 1909 at 34,253,000, the total sum received in wages and salaries would be approximately \$12,331,000,000, of which 2 per cent. would produce about \$250,000,000 a year. Now, at age sixty-five, an old age pension scheme for the entire United States population, at the rate of only \$1.50 a week, would cost about \$279,000,000, whereas at \$2.50 a week it would cost over \$462,000,000. It would therefore require at least 2 per cent. of all wages and salary payments, producing approximately \$250,000,000, on the basis of the previous estimate, while nearly 4 per cent. would be required, exclusive of administration expenses, to provide the higher rate of pension of \$2.50. Since the wage tax would be derived from practically the entire productive population, it may safely be estimated that at least 75 per cent. of the entire population at ages sixty-five and over would take advantage of old age pensions if they were offered as a *right* under the conditions stated in view of the fact that the payments were produced by deductions from wages. Few who have argued in behalf of retirement funds and pensions in the civil service have gone further than to suggest deductions of 2 per cent. A lower age than sixty-five would involve an enormous increase in the cost, and necessitate wage deductions of at least 3 per cent., if not more, while a higher age would make the scheme more nearly feasible. Curiously enough, it has been estimated in Germany that the cost of the old age pension and invalidity system amounts to about 2 per cent. on wages, but this apparently is only the portion paid by industry, so that double the proportion would represent approximately the total cost; that is, 4 per cent. of the pay-roll would be necessary to produce the pensions which are granted to German workingmen.

Upon one point, however, there should be no mistake, and that is the unquestionable truth that old age pensions will not materially change the lot of those who are most in need of moral and material uplift,—the very poor and pauper classes. It is very doubtful if it can be said with truth that the problem of to-day is that of poverty, against the problem of pauperism at an earlier period, for, while fortunately the actual extent of pauperism in this country is not large, there is really more of it than is generally assumed. Not even in Germany has state insurance, so called, reached this most unfortunate element, and in the nature of the case it is very doubtful if it ever can. State pensions in old age granted *as a right* will in fact reach a totally different class than the very poor or pauper element, most in need of financial security and support. The class which would be reached manages now, somehow, to keep out of the poor-house and the ministering hands of private or public charities by making skilful use of every expedient to maintain self-respect and independence in old age. The poor in this respect have resources unsuspected by the well-to-do, resulting from their solidarity and independence, quite different from the prevailing ethical conceptions among the more prosperous element of the population. There are those who think little of the sacrifices of the poor, and there are those who grieve at their sorrow and suffering, but in the making of character and the development of the strength of the people the ministry of sorrow has its place for the infinite good of the race as a whole. It is one of the most discouraging signs of the time, foreboding ill for the future, that the capacity for suffering, self-sacrifice, and self-denial, should be less common than in former years, and the most conclusive evidence of this assertion is to be found in the ever-increasing tendency toward suicide throughout the various civilized countries of the earth.

It is difficult to understand why those who are so profoundly interested in this subject of old age pensions and the more or less deplorable condition of the poor in old age do not take steps to secure by direct inquiry and careful analysis the facts which will go far to explain why three-fourths or more of the

population in old age are *not* in the poorhouses, not public charges, and not economically dependent in any sense whatever. By an analysis made some years ago of the proportion of paupers in Massachusetts almshouses, among the total population at ages sixty and over I found that only two in every hundred were in this unfortunate predicament, and that even at ages ninety and over the proportion was less than 5 per cent. Now, it seems to me of far greater importance than the question why there should be poverty in old age (which in fact is simple enough and really requires no extended analysis of methods or motives) to ascertain how it is that the 98 per cent. who are *not* in almshouses have managed to keep out of them and what their respective conditions really are.

Summarizing the foregoing remarks and conclusions, they appear to confirm the view arrived at by a strictly scientific and impartial analysis of the available facts that:—

The only state pension *plan* which is likely to meet with public approval must be on a non-contributory basis, corresponding to the recent English act and the more or less similar laws of New Zealand and New South Wales.

The economic or social *necessity* for such a radical innovation has not been established for the state of Massachusetts or for any other American state.

The term “pension,” as used in connection with the agitation for systematic financial provision for the aged, is misleading in that what is guaranteed is not a pension in the true sense of the word, but poor-relief under another name.

At the present time, of the *population* of the United States sixty-five years of age and over, 1.6 per cent. are *in almshouses*, and, while of the remainder quite a proportion, no doubt, are dependent or physically infirm, they are not a very heavy burden to the tax-payers under the prevailing methods of charitable relief. In Massachusetts out of every one hundred of the population over sixty-five years of age, only 1.4 are in almshouses, and no very decided divergence from this proportion is met with in other states.

The age sixty-five is usually suggested as a minimum, and

seventy is generally conceded to be too high to result in any material improvement in the financial circumstances of the aged. The demand, however, is practically certain, in course of time, to be for a reduction of the pensionable age to sixty, which, of course, would enormously increase the cost of whatever state pension scheme might be adopted.

A serious consideration is implied in the probability that *invalidity*, or physical unfitness for work, at other than the pensionable age period, would be considered as of equal right entitled to systematic state support, and the tendency would be to follow the method of New South Wales, and make such invalidity or incapacity pensionable at ages sixty and over. (In Denmark the age is fifty-five.)

The *ultimate cost* of a state pension scheme varies with the pensionable age adopted, the pensionable amount granted, and the pensionable proportion of the population within the pensionable class. In New South Wales the proportion actually receiving pensions at ages sixty-five and over is 40 per cent., but there are strong reasons to believe that the proportion in the United States would be larger, provided the pension were granted as a right, and not as a privilege.

A minimum pension rate fairly in conformity to the American standard of life would need to be at least \$2.50 a week, or about \$130 a year. The Massachusetts proposals, however, have been as high as \$260 a year, which, of course, would impose a decidedly greater burden upon the tax-payers of the state. In proportion as the amount payable is increased, the numbers who would take advantage of the pension grants would be increased.

As to the probable *pensionable proportion* of the population, it is safe to assume that the large majority of the aged, if entitled to a state pension as a right, would avail themselves of their prerogative under whatever legislation might be adopted.

In the United States at the present time the estimated population aged sixty-five and over is 3,557,000, and, if 50 per cent. of this population were to receive pensions, *the annual cost*

at the rate of \$130 a year would be \$231,190,000.* In the state of Massachusetts the population aged sixty-five and over may be conservatively estimated at 162,000, and 50 per cent. of this population, at a pensionable rate of \$130 per annum, would require an annual expenditure of \$10,520,000, exclusive, of course, of the cost of administration. If the pensionable age were reduced to sixty, the cost for the United States, upon the preceding assumption, would be \$366,132,000, and for the state of Massachusetts \$16,424,000. If the pensionable age, however, were placed at seventy, the cost for the United States would be \$133,256,000, and for Massachusetts \$6,228,000, exclusive, of course, of the expenses of administration.

The *administrative expenses* have been estimated at 3 per cent. for the Australian Commonwealth, but they would probably in this country attain to a somewhat higher proportion, and hardly be less than 5 per cent. of the total pensionable amounts.

The *final total cost* of a state pension scheme on the non-contributory plan would have to be raised by additional taxation, and the source of such taxation would probably be a substantial increase in the poll tax, or a special tax on inheritance, an income tax, or, finally, a stamp tax on wages.

A *poll tax* of \$2 a year would be wholly inadequate to meet the minimum cost requirements, while even a poll tax of \$5, as it has been suggested, would, in all probability, still be insufficient. What amounts could be produced by specific taxes on inheritances is merely conjectural. A *stamp tax* of 2 per cent. on wages would also probably prove insufficient, and as much as 4 per cent., if not more, might be required.

It is probable that the various *disqualifications* for pensions which have been suggested would gradually be done away with, and correspondingly, of course, the total amounts to be provided for by taxation would increase. A gradual increase in the longevity of the aged would also tend to enhance the financial difficulties of the proposition, so much so that a very material

* At 40 per cent. of pensionable population, the annual cost would be \$184,952,000. For details, see the tables in the statistical appendix.

addition to the original and preliminary estimate might be necessary.*

Anticipations of a material *reduction in general poor-law expenditures* are not likely to be realized, judging by the experience of New Zealand, New South Wales, and Victoria, according to the evidence presented to the Commission on Old Age Pensions for the Australian Commonwealth. The fact is apt to be overlooked that the very large proportion of indoor and outdoor pauperism and poverty applies to other groups than those included within the pensionable group. For illustration, of all the paupers of known ages in almshouses in the United States in 1904, only 33 per cent. were of the age period sixty-five and over. It is equally doubtful whether any considerable proportion of indoor paupers could be induced to leave their respective institutions, and in time experience would repeat itself, as proven in the case of soldiers' homes, where pensions are paid in addition to indoor support at public expense.†

Arguments that the workers of the nation are quite as rightfully entitled to pensions as workers *for* the nation, as soldiers, sailors, or civil service employees, are not valid, because general wage-workers and salary-earners are primarily serving their own interests, and not that of the nation at large.

State pensions in old age will not solve *the problem of poverty and pauperism*, or economic dependence, but, on the contrary, such pensions will materially undermine the thrift function at every period of life. English experience has been to the effect that the prospect of a government pension in old age has prevented large numbers from becoming subscribers to the voluntary superannuation funds of friendly societies, and there is no reason to suppose that the experience in this country would

* For illustrations of the cost of insurance at selected ages, see the tables of the statistical appendix. For an extended discussion of "A Method of Providing with Certainty for Dependent Old Age," by Mr. John F. Dryden, see *The American Underwriter* for September, 1908. Reference may also be had to my address on "The Problem of Poverty and Pensions in Old Age," *American Journal of Sociology* for September, 1908.

† The most valuable sources of information on the whole subject of pauperism and dependence is the recently published report of a Royal Commission on the Poor Laws and Relief of Distress, London, 1909, Parliamentary Paper, Cd. 4499, price 5s 6d., obtainable through P. S. King & Son, London.

not be identical and affect all the various lines of voluntary savings, investments, and insurance.

The possible solution of at least some of the most perplexing problems resulting from poverty and pauperism would seem to lie in *entirely different directions* than state pensions for the aged. Improved methods of poor-law administration would do much, but even more decidedly beneficial would be the results of an improved system of industrial education, possibly a more just and equitable method of industrial remuneration for work actually and well done. Increased efficiency would materially increase the earning capacity of the wage-earners of the nation, and correspondingly their opportunities to provide in their own way and at their own cost for dependent survivors in the event of death, and for themselves in the event of old age. Strong faith may also be placed in more rational methods of teaching thrift in the public schools and by otherwise inculcating habits of prudence and self-denial, by increased security for the savings and investments of those constituting the large group who work for wages or small salaries and who, in the event of the loss of their savings, practically lose their all. Much more may be done by insurance than has thus far been possible, but it will require time to develop more systematic habits of savings as a prerequisite for the highest development of the life insurance business.* Old age annuities have their limitations and they are not popular with the young, but a healthy public interest should be aroused in this subject by wide-spread agitation and illustrations of the exact cost to be incurred and the benefits to be realized. What has already been done in this direction is of the greatest possible credit to the prudent and thrifty who constitute the overwhelming majority of the population, and, where so much has been done practically unaided and alone by wage-earners in their own way and at their own cost, we may be confident that in the future tendencies in this direction will not diminish, but rather increase. Better education is necessary in domestic economy, in the rational expenditure of wage-earners' money for both the necessities and the luxuries of life,

* For details and tables of premium rates, see the statistical appendix.

so that the waste may be reduced to a minimum and accrue to their decided advantage by an increased margin available for voluntary savings, investments, and insurance. State insurance as a substitute for private insurance is open to serious objections, and experience demonstrates that governments have not been able successfully to compete with private enterprise in this field. The recent experiment in Massachusetts is too new to warrant definite conclusions, but, if it will aid the cause of thrift and benefit the people, it is to be hoped that the innovation will prove a success. There is abundant room for competition between private enterprise and the state, provided the latter does not take an undue advantage over the former by the control which, in the nature of things, the state has over the taxing power, which implies the power to hinder and destroy.

In its final analysis, however, the whole problem of state pensions in old age strikes at the root of national life and character and involves the tremendous possibility of permanent injury to the highest ideals of family and social life. Practically all of human progress has been achieved by struggling, and, of all the incentives making for the development of right habits of living, there is not one more important than the desire for economic independence in old age, achieved by the people in their own way and at their own cost. It will be a dark day for the republic when that incentive is taken from the masses by a state pension scheme based solely upon sentimental considerations for the needs of the few, with a disregard for the vastly more important rights and liberties of the many.

Those who so fondly believe that all the ills of mankind are curable by law or legislation may be reminded of the words of the late Mr. Arnold Foster, M.P., that "it is a peculiarity of Acts of Parliament that in nine cases out of ten they produce no results, or results totally different from those which were intended by the framers," and that will very probably be the outcome of any deliberate attempt to force a state pension scheme upon the people, who, by all the present standards of comfort, wealth, and progress, do not now need it, and let us fervently hope that they never may.

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TABLE 1.—ESTIMATED COST OF STATE PENSIONS.
PENSIONABLE AGE, SIXTY YEARS. AMOUNT OF PENSION, \$2.50 A WEEK.

States and Territories.	Population 1909.	Maximum Amount Pay- able in State Pensions (Whole Population).	Probable Mini- mum Amount Payable (40 per Cent. Pension- able).
Alabama	100,781	\$13,101,530	\$5,240,612
Alaska	2,971	386,230	154,492
Arizona	8,744	1,136,720	454,688
Arkansas	59,803	7,774,390	3,109,756
California	147,888	19,225,440	7,690,176
Colorado	29,647	3,854,110	1,541,644
Connecticut	90,675	11,787,750	4,715,100
Delaware	14,632	1,902,160	760,864
District of Columbia	23,071	2,999,230	1,199,692
Florida	29,841	3,879,330	1,551,732
Georgia	126,336	16,423,680	6,569,472
Hawaii	7,110	924,300	369,720
Idaho	10,946	1,422,980	569,192
Illinois	356,755	46,378,150	18,551,260
Indiana	205,554	26,722,020	10,688,808
Indian Territory and Oklahoma	56,053	7,286,890	2,914,756
Iowa	159,060	20,677,800	8,271,120
Kansas	107,145	13,928,850	5,571,540
Kentucky	136,710	17,772,300	7,108,920
Louisiana	76,710	9,972,300	3,988,920
Maine	85,639	11,133,070	4,453,228
Maryland	89,701	11,661,130	4,664,452
Massachusetts	252,672	32,847,360	13,138,944
Michigan	207,439	26,967,070	10,786,828
Minnesota	126,087	16,391,310	6,556,524
Mississippi	85,586	11,126,180	4,450,472
Missouri	206,342	26,824,460	10,729,784
Montana	12,671	1,647,230	658,892
Nebraska	57,296	7,448,480	2,979,392
Nevada	3,619	470,470	188,188
New Hampshire	51,139	6,648,070	2,659,228
New Jersey	161,148	20,949,240	8,379,696
New Mexico	12,039	1,565,070	626,028
New York	655,565	85,223,450	34,089,380
North Carolina	116,958	15,204,540	6,081,816
North Dakota	19,836	2,578,680	1,031,472
Ohio	357,892	46,525,960	18,610,384
Oregon	32,645	4,243,850	1,697,540
Pennsylvania	478,682	62,228,790	24,891,516
Rhode Island	38,733	5,035,290	2,014,116
South Carolina	74,622	9,700,860	3,880,344
South Dakota	25,800	3,354,000	1,341,600
Tennessee	118,941	15,462,330	6,184,932
Texas	154,626	20,101,390	8,040,552
Utah	18,832	2,448,160	979,264
Vermont	41,883	5,444,790	2,177,916
Virginia	126,832	16,488,160	6,595,264
Washington	32,827	4,267,510	1,707,004
West Virginia	60,166	7,821,580	3,128,632
Wisconsin	172,994	22,489,220	8,995,688
Wyoming	3,157	410,410	164,164
Total for United States	5,632,802	\$732,264,260	\$292,905,704

TABLE 2.—ESTIMATED COST OF STATE PENSIONS.
PENSIONABLE AGE, SIXTY-FIVE. AMOUNT OF PENSION, \$2.50 A WEEK.

States and Territories.	Population 1909.	Maximum Amount Pay- able in State Pensions (Whole Population).	Probable Mini- mum Amount Payable (40 per Cent. Pension- able).
Alabama	62,962	\$8,185,060	\$3,274,024
Alaska	1,508	196,040	78,416
Arizona	4,930	640,900	256,360
Arkansas	35,439	4,607,070	1,842,828
California	90,328	11,742,640	4,697,056
Colorado	17,932	2,331,160	932,464
Connecticut	59,044	7,675,720	3,070,288
Delaware	9,170	1,192,100	476,840
District of Columbia	13,565	1,763,450	705,380
Florida	18,013	2,341,690	936,676
Georgia	76,722	9,973,860	3,989,544
Hawaii	3,682	478,660	191,464
Idaho	6,364	827,320	330,928
Illinois	226,402	29,432,260	11,772,904
Indiana	131,701	17,121,130	6,848,452
Indian Territory and Oklahoma	31,211	4,057,430	1,622,972
Iowa	104,720	13,613,600	5,445,440
Kansas	66,022	8,582,860	3,433,144
Kentucky	86,647	11,264,110	4,505,644
Louisiana	47,256	6,143,280	2,457,312
Maine	57,672	7,497,360	2,998,944
Maryland	55,667	7,236,710	2,894,684
Massachusetts	161,912	21,048,560	8,419,424
Michigan	133,582	17,365,660	6,946,264
Minnesota	82,616	10,740,080	4,296,032
Mississippi	51,995	6,759,350	2,703,740
Missouri	127,087	16,521,310	6,608,524
Montana	6,868	892,840	357,136
Nebraska	34,978	4,547,140	1,818,856
Nevada	2,123	275,990	110,396
New Hampshire	34,920	4,539,600	1,815,840
New Jersey	99,747	12,967,110	5,186,844
New Mexico	6,986	908,180	363,272
New York	417,019	54,212,470	21,684,988
North Carolina	74,973	9,746,490	3,898,596
North Dakota	12,384	1,609,920	643,968
Ohio	232,010	30,161,300	12,064,520
Oregon	20,163	2,621,190	1,048,476
Pennsylvania	301,259	39,163,670	15,665,468
Rhode Island	24,136	3,137,680	1,255,072
South Carolina	44,713	5,812,690	2,325,076
South Dakota	15,938	2,071,940	828,776
Tennessee	74,197	9,645,610	3,858,244
Texas	92,246	11,991,980	4,796,792
Utah	12,329	1,602,770	641,108
Vermont	28,688	3,729,440	1,491,776
Virginia	80,083	10,410,790	4,164,316
Washington	19,227	2,499,510	999,804
West Virginia	38,370	4,988,100	1,995,240
Wisconsin	117,608	15,289,040	6,115,616
Wyoming	1,661	215,930	86,372
Total for United States	3,556,775	\$462,380,750	\$184,952,300

TABLE 3.—ESTIMATED COST OF STATE PENSIONS.
PENSIONABLE AGE, SEVENTY. AMOUNT OF PENSION, \$2.50 A WEEK.

States and Territories.	Population 1909.	Maximum Amount Pay- able in State Pensions (Whole Population).	Probable Mini- mum Amount Payable (40 per Cent. Pension- able).
Alabama	36,763	\$4,779,190	\$1,911,676
Alaska	846	109,980	43,992
Arizona	2,789	362,570	145,028
Arkansas	19,196	2,495,480	998,192
California	48,891	6,355,830	2,542,332
Colorado	8,312	1,080,560	432,224
Connecticut	35,638	4,632,940	1,853,176
Delaware	5,243	681,590	272,636
District of Columbia	7,765	1,009,450	403,780
Florida	10,128	1,316,640	526,656
Georgia	44,499	5,784,870	2,313,948
Hawaii	2,053	266,890	106,756
Idaho	3,170	412,100	164,840
Illinois	128,638	16,722,940	6,689,176
Indiana	74,696	9,710,480	3,884,192
Indian Territory and Oklahoma	15,287	1,987,310	794,924
Iowa	60,940	7,922,200	3,168,880
Kansas	35,661	4,635,930	1,854,372
Kentucky	49,822	6,476,860	2,590,744
Louisiana	27,836	3,618,680	1,447,472
Maine	35,284	4,586,920	1,834,768
Maryland	32,055	4,167,150	1,666,860
Massachusetts	95,819	12,456,470	4,982,588
Michigan	77,323	10,051,990	4,020,796
Minnesota	47,580	6,185,400	2,474,160
Mississippi	30,196	3,925,480	1,570,192
Missouri	70,177	9,123,010	3,649,204
Montana	3,365	437,450	174,980
Nebraska	19,099	2,482,870	993,148
Nevada	1,115	144,950	57,980
New Hampshire	21,670	2,817,100	1,126,840
New Jersey	57,166	7,431,580	2,972,632
New Mexico	3,819	496,470	198,588
New York	246,381	32,029,530	12,811,812
North Carolina	44,341	5,764,330	2,305,732
North Dakota	6,862	892,060	356,824
Ohio	135,990	17,678,700	7,071,480
Oregon	10,966	1,425,580	570,232
Pennsylvania	173,803	22,594,390	9,037,756
Rhode Island	14,127	1,836,510	734,604
South Carolina	25,831	3,358,030	1,343,212
South Dakota	8,716	1,133,080	453,232
Tennessee	41,596	5,407,480	2,162,992
Texas	51,038	6,634,940	2,653,976
Utah	7,384	959,920	383,968
Vermont	18,253	2,372,890	949,156
Virginia	47,155	6,130,150	2,452,060
Washington	9,781	1,271,580	508,612
West Virginia	22,364	2,907,320	1,162,928
Wisconsin	71,885	9,345,050	3,738,020
Wyoming	787	102,310	40,924
Total for United States	2,050,101	\$266,513,130	\$106,605,252

TABLE 4.—STATISTICS OF MILITARY PENSIONS, 1863-1907.

(From Statistical Abstract of the United States, 1907, p. 676.)

Year ended June 30.	Number of Pensioners on the Rolls.			First Payments.	Pensions, exclusive of First Payments.	Total Disbursements for Pensions.	Cost, Maintenance and Expenses.
	Invalids.	Widows, etc.	Total.				
				Dollars.	Dollars.	Dollars.	Dollars.
1863	7,821	6,970	14,791	—	—	1,025,139.91	—
1864	23,479	27,656	51,135	—	—	4,504,616.92	—
1865	35,880	50,106	85,986	—	—	8,525,153.11	—
1866	55,652	71,070	126,722	—	—	15,450,549.88	407,165.00
1867	71,856	83,618	155,474	—	—	20,784,789.69	490,977.35
1868	75,957	93,686	169,643	—	—	23,101,509.36	553,020.34
1869	82,859	105,104	187,963	—	—	28,513,247.27	564,526.81
1870	87,521	111,165	198,686	—	—	29,351,488.78	600,997.86
1871	93,394	114,101	207,495	—	—	28,518,792.62	863,079.00
1872	113,954	118,275	232,229	—	—	29,752,746.81	951,253.00
1873	119,500	118,911	238,411	—	—	26,982,063.89	1,003,200.64
1874	121,628	114,613	236,241	—	—	30,206,778.99	966,794.13
1875	122,989	111,832	234,821	—	—	29,270,404.76	982,695.35
1876	124,239	107,898	232,137	—	—	27,936,209.53	1,015,078.81
1877	128,723	103,381	232,104	3,284,937.12	24,897,884.60	28,182,821.72	1,034,459.33
1878	131,649	92,349	223,998	2,992,352.17	23,793,657.27	26,786,009.44	1,032,500.09
1879	138,615	104,140	242,755	5,763,758.60	27,900,670.32	33,664,428.92	837,734.14
1880	145,410	105,392	250,802	12,468,191.20	44,221,037.88	56,689,229.08	935,027.28
1881	164,110	104,720	268,830	23,628,176.61	26,955,228.74	50,583,405.35	1,072,059.64
1882	182,633	103,064	285,697	26,421,669.19	27,891,502.86	54,313,172.05	1,466,236.01
1883	206,042	97,616	303,658	29,906,753.94	30,520,819.87	60,427,573.81	2,591,648.29
1884	225,470	97,286	322,756	23,413,815.10	34,498,572.37	57,912,387.47	2,835,181.00
1885	247,146	97,979	345,125	27,115,912.21	38,056,024.91	65,171,937.12	3,392,576.34
1886	270,346	95,437	365,783	22,137,054.16	41,954,088.74	64,091,142.90	3,245,016.61
1887	306,298	99,709	406,007	25,166,990.06	48,586,007.02	73,752,997.08	3,753,400.91
1888	343,701	108,856	452,557	22,299,605.46	56,650,896.21	78,950,501.67	3,515,057.27
1889	373,699	116,026	489,725	21,442,349.13	67,400,371.45	88,842,720.58	3,466,968.40
1890	415,654	122,290	537,944	38,721,866.03	67,371,984.36	106,093,850.39	3,526,382.13
1891	536,821	139,339	676,160	38,652,274.31	78,660,416.19	117,312,690.50	4,700,636.44
1892	703,242	172,826	876,068	45,114,167.68	94,279,979.43	139,394,147.11	4,898,665.80
1893	759,706	206,306	966,012	33,756,549.38	123,150,088.56	156,906,637.94	4,867,734.42
1894	754,382	215,162	969,544	11,917,359.58	128,069,366.59	139,986,726.17	3,963,976.31
1895	751,456	219,068	970,524	11,451,133.01	128,361,161.29	139,812,294.30	4,338,020.21
1896	748,514	222,164	970,678	11,289,278.48	126,931,425.98	138,220,704.46	3,991,375.61
1897	747,492	228,522	976,014	12,575,601.40	127,374,115.95	139,949,717.35	3,967,783.07
1898	758,511	235,203	993,714	15,542,914.03	129,108,965.77	144,651,879.80	4,114,091.46
1899	754,104	237,415	991,519	9,247,957.75	129,107,095.20	138,355,052.95	4,147,517.73
1900	752,510	241,019	993,529	9,828,525.07	128,633,605.58	138,462,130.65	3,841,706.74
1901	748,640	249,086	997,726	9,934,763.54	128,596,720.30	138,531,483.84	3,868,795.44
1902	739,443	260,003	999,446	8,677,548.44	128,826,719.55	137,504,267.99	3,831,378.96
1903	729,356	267,189	996,545	9,359,905.69	128,399,748.02	137,759,653.71	3,993,216.79
1904	720,921	273,841	994,762	10,396,375.33	130,697,196.16	141,093,571.49	3,849,366.25
1905	717,761	280,680	998,441	8,940,064.00	132,202,797.33	141,142,861.33	3,721,832.82
1906	701,483	284,488	985,971	6,152,182.67	132,848,105.58	139,000,288.25	3,523,269.51
1907	679,937	287,434	967,371	6,643,768.39	131,511,644.07	138,155,412.46	3,309,110.44

The following amounts have been paid to soldiers, their widows, minor children, and dependent relatives on account of military and naval service during the wars in which the United States has been engaged:—

War of the Revolution (estimated)	\$70,000,000.00
War of 1812 (on account of service, without regard to disability)	45,625,899.24
Indian wars (on account of service, without regard to disability)	8,822,387.20
War with Mexico (on account of service, without regard to disability)	39,397,733.57
War of the Rebellion	3,389,135,449.54
War with Spain	18,909,512.43
Regular establishment	9,864,344.67
Unclassified	16,260,397.04
Actual total disbursements in pensions	\$3,598,015,723.69

TABLE 5.—STATISTICS OF PAUPERS IN ALMSHOUSES.*

UNITED STATES.

Ages.	Estimated Population, 1904.	Paupers.	
		Number.	Per Cent. of Total Population.
Under 20	36,310,593	12,857	0.04
20-39	26,192,585	30,237	0.12
40-59	13,871,462	47,806	0.34
60-64	1,958,324	16,311	0.83
65-69	1,387,146	15,499	1.12
70-74	979,162	15,184	1.55
75-79	571,177	11,053	1.94
80-84	244,790	6,861	2.80
85-89	94,652	2,854	3.02
90 and over	35,902	1,344	3.74
65 and over	3,312,829	52,795	1.59

* Bureau of the Census, Special Report, entitled "Paupers in Almshouses, 1904," by Mr. John Koren, expert special agent. Washington, 1906.

TABLE 6.—STATISTICS OF PAUPERS IN ALMSHOUSES.*

MASSACHUSETTS.

Ages.	Estimated Population, 1903.	Paupers.	
		Number.	Per Cent. of Total Population.
Under 20	1,071,095	278	0.03
20-39	1,088,947	802	0.07
40-59	580,176	1,934	0.33
60-64	86,282	692	0.80
65-69	62,480	628	1.01
70-74	41,653	605	1.45
75-79	26,777	476	1.78
80-84	13,686	280	2.05
85-89	5,117	121	2.36
90 and over	1,636	44	2.69
65 and over	151,349	2,154	1.42

* Bureau of the Census, Special Report, entitled "Paupers in Almshouses, 1904," by Mr. John Koren, expert special agent. Washington, 1906. The enumeration of paupers by States was made only as of date Dec. 31, 1903.

TABLE 7.—STATISTICS OF THE INSANE IN HOSPITALS.*

UNITED STATES.

Ages.	Estimated Population, 1904.	Insane.	
		Number.	Per Cent. of Total Population.
Under 20	36,310,593	4,111	0.01
20-39	26,192,585	75,666	0.29
40-59	13,871,462	82,959	0.60
60-64	1,958,324	12,166	0.62
65-69	1,387,146	8,549	0.62
70-74	979,162	5,973	0.61
75-79	571,177	3,430	0.60
80-84	244,790	1,694	0.69
85-89	94,652	559	0.59
90 and over	35,902	176	0.49
65 and over	3,312,829	20,375	0.61

* Bureau of the Census, Special Report, entitled "Insane and Feeble-minded in Hospitals and Institutions, 1904." Washington, 1906. Investigation made and Report prepared by Mr. John Koren, expert special agent.

TABLE 8.—STATISTICS OF THE INSANE IN HOSPITALS.*

MASSACHUSETTS.

Ages.	Estimated Population, 1904.	Insane.	
		Number.	Per Cent. of Total Population.
Under 20	1,092,962	226	0.02
20-39	1,110,950	4,551	0.41
40-59	592,221	5,247	0.89
60-64	88,297	873	0.99
65-69	63,855	673	1.05
70-74	42,132	496	1.18
75-79	27,323	314	1.15
80-84	13,908	155	1.11
85-89	5,213	63	1.21
90 and over	1,666	13	0.78
65 and over	154,097	1,714	1.11

* Bureau of the Census, Special Report, entitled "Insane and Feeble-minded in Hospitals and Institutions, 1904." Washington, 1906. Investigation made and Report prepared by Mr. John Koren, expert special agent.

TABLE 9.—STATISTICS OF ACUTE AND CHRONIC DISEASES.*

STATE OF MASSACHUSETTS.

(Census of 1905.)

Ages.	Estimated Population, 1905.	Acute Disease Cases.		Chronic Disease Cases.	
		Number.	Per Cent. of Total Population.	Number.	Per Cent. of Total Population.
Under 60	2,832,048	3,717	0.13	11,941	0.42
60-69	155,544	265	0.17	5,666	3.64
70-79	70,480	124	0.18	3,584	5.09
80 and over	21,136	44	0.21	1,009	4.77

* Bureau of Statistics of Labor, Labor Bulletins for October and November, 1907, Boston, 1907.

TABLE 10.—ESTIMATE OF POLL TAX YIELD.*

STATE OF MASSACHUSETTS.

Male population of ages 18 and over, 1890	723,542
Male population of ages 18 and over, 1900	909,208
Estimated male population of ages 18 and over, 1909	1,076,311

* A poll tax of \$2 per male person (ages 18 and over) would yield the State of Massachusetts in 1909 the sum of \$2,152,622, according to the above estimate.

TABLE 11.—WAGE-EARNERS AND WAGES IN MANUFACTURING INDUSTRIES.

UNITED STATES CENSUS, 1905.

	Number.	Wages and Salaries.	Average.
Salaried persons	519,751	\$574,761,231	\$1,106
Wage-earners	5,470,321	2,611,540,532	477
Total	5,990,072	\$3,186,301,763	\$532

TABLE 12.—PERSONS EMPLOYED IN GAINFUL OCCUPATIONS.*

UNITED STATES, 1890-1909.

Years.	Males.	Females.	Total.
1890	19,312,651	4,005,532	23,318,183
1900	23,753,836	5,319,397	29,073,233
Estimated to 1909	27,750,907	6,501,880	34,252,787

* Estimating the average yearly earnings of all persons in gainful occupations to be \$360, the aggregate amount which will be paid in the United States in 1909 in the form of wages is 34,252,787 × 360, or \$12,331,003,320.

TABLE 13.—STATISTICS OF POST-OFFICE ANNUITIES (DEFERRED).

UNITED KINGDOM, 1865-1906.

Years.	Number of New Contracts Issued.	Amounts.			
		£	s.	d.	\$
1865-68	198	3,711	14	—	(18,063)
1869	45	1,044	15	—	(5,084)
1870	57	1,195	19	6	(5,820)
1871	36	710	9	—	(3,457)
1872	38	721	14	—	(3,512)
1873	35	583	19	—	(2,842)
1874	53	992	2	—	(4,828)
1875	34	768	17	—	(3,742)
1876	29	464	3	—	(2,259)
1877	58	1,251	8	—	(6,090)
1878	50	1,370	8	—	(6,669)
1879	49	958	2	—	(4,663)
1880	41	847	2	—	(4,122)
1881	66	1,375	16	—	(6,695)
1882	72	1,502	10	—	(7,312)
1883	104	2,120	2	—	(10,317)
1884	93	2,410	12	—	(11,731)
1885	103	1,694	—	—	(8,244)
1886	87	1,771	16	—	(8,622)
1887	90	1,627	13	—	(7,921)
1888	138	2,719	3	—	(13,233)
1889	131	2,857	13	6	(13,907)
1890	116	2,527	5	—	(12,299)
1891	142	2,182	14	—	(10,622)
1892	214	4,252	17	6	(20,697)
1893	168	3,431	10	—	(16,699)
1894	174	4,107	10	—	(19,989)
1895	179	4,433	1	6	(21,574)
1896	211	4,441	7	6	(21,614)
1897	216	4,373	7	6	(21,283)
1898	179	4,028	9	2	(19,604)
1899	158	3,491	18	4	(16,993)
1900	149	3,035	15	6	(14,774)
1901	152	3,356	13	—	(16,335)
1902	153	3,292	12	6	(16,024)
1903	166	3,649	—	6	(17,758)
1904	136	2,730	3	—	(13,286)
1905	175	3,636	14	6	(17,698)
1906	142	3,181	14	6	(15,484)

TABLE 14.—NEW POLICY ISSUE OF ENGLISH LIFE INSURANCE COMPANIES WHICH DO NOT EMPLOY AGENTS OR SOLICITORS, 1898-1907.

Years.	Equitable (established 1762).	London Life (established 1806).	Metropolitan (established 1835).
1898	450	257	191
1899	299	251	152
1900	272	252	162
1901	257	241	167
1902	250	230	200
1903	263	258	195
1904	258	252	174
1905	290	248	163
1906	262	228	167
1907	236	277	198

TABLE 15.—STATISTICS OF AMERICAN LEGAL RESERVE LIFE INSURANCE, 1850-1907.

POLICY ACCOUNT.

Calendar Year.	Ordinary.		Industrial.		Total.	
	Number of Policies.	Amount.	Number of Policies.	Amount.	Number of Policies.	Amount.
		<i>Dollars.</i>		<i>Dollars.</i>		<i>Dollars.</i>
1850 . .	29,407	68,614,189	—	—	—	—
1860 . .	60,000	180,000,000	—	—	—	—
1870 . .	889,226	2,262,847,000	—	—	—	—
1880* . .	679,690	1,564,183,532	236,674	20,533,469	916,364	1,584,717,001
1886 . .	926,497	2,365,696,617	1,780,372	198,431,170	2,706,869	2,564,127,787
1887 . .	992,987	2,599,576,117	2,310,003	255,533,472	3,302,990	2,855,109,589
1888 . .	1,091,357	2,896,099,365	2,797,521	305,155,182	3,888,878	3,201,254,547
1889 . .	1,218,008	3,291,828,258	3,365,461	365,841,518	4,583,469	3,657,669,776
1890 . .	1,319,561	3,620,057,439	3,883,529	429,621,128	5,203,090	4,049,678,567
1891 . .	1,465,459	3,964,491,593	4,319,817	481,919,116	5,785,276	4,446,410,709
1892 . .	1,531,231	4,314,204,343	5,200,777	583,527,016	6,732,008	4,897,731,359
1893 . .	1,754,303	4,629,774,861	5,751,514	662,050,129	7,505,817	5,291,824,990
1894 . .	1,868,954	4,765,220,494	6,833,439	800,946,170	8,702,393	5,566,166,664
1895 . .	1,940,945	4,917,694,131	6,952,757	820,740,641	8,893,702	5,738,434,772
1896 . .	2,024,927	5,054,800,906	7,388,119	888,266,586	9,413,046	5,943,067,492
1897 . .	2,201,193	5,329,980,648	8,005,384	996,139,424	10,206,577	6,326,120,072
1898 . .	2,419,850	5,714,964,251	8,798,480	1,110,073,519	11,218,330	6,825,037,770
1899 . .	2,620,950	6,481,154,483	10,050,847	1,293,125,522	12,871,797	7,774,280,005
1900 . .	3,176,051	7,093,152,380	11,219,296	1,468,986,366	14,395,347	8,562,138,746
1901 . .	3,693,702	7,952,989,395	12,337,022	1,640,857,553	16,030,724	9,593,846,948
1902 . .	4,160,088	8,701,587,912	13,448,124	1,806,890,864	17,608,212	10,508,478,776
1903 . .	4,694,021	9,593,008,148	14,603,694	1,977,599,397	19,297,715	11,570,607,545
1904 . .	5,507,759	10,412,078,338	15,674,394	2,135,859,103	21,182,143	12,547,937,441
1905 . .	5,621,417	11,054,255,524	16,872,593	2,309,754,235	22,494,000	13,364,009,759
1906 . .	5,792,956	11,253,194,077	17,841,396	2,453,616,207	23,634,352	13,706,810,284
1907 . .	5,945,780	11,486,518,261	18,849,357	2,577,896,941	24,795,137	14,064,415,202

* The Industrial Insurance was established in the United States by the Prudential Insurance Company in 1875.

TABLE 16.—FINANCIAL STATISTICS OF AMERICAN LEGAL RESERVE LIFE INSURANCE COMPANIES, ORDINARY AND INDUSTRIAL COMBINED, 1880-1907.

Calendar Year.	Total Income.	Total Payments to Policy-holders.	Assets.	Liabilities.	Surplus.
	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
1880	80,537,990	55,881,794	452,680,651	—	—
1886	123,614,000	64,029,451	585,201,199	—	—
1887	137,913,159	71,231,568	619,137,675	—	—
1888	155,477,074	77,542,039	668,196,883	—	—
1889	177,607,718	83,031,083	720,237,645	—	—
1890	196,938,069	90,007,820	770,972,061	678,681,309	92,290,752
1891	213,444,589	97,026,344	840,579,127	740,226,450	100,352,677
1892	227,622,957	104,506,882	919,342,031	802,677,076	116,664,955
1893	241,727,503	112,648,941	987,946,922	868,600,298	119,346,624
1894	261,959,111	118,423,246	1,073,156,679	930,937,755	142,218,924
1895	271,928,709	125,136,443	1,159,873,889	997,668,526	162,205,363
1896	283,726,855	136,179,008	1,243,561,111	1,066,541,285	177,019,826
1897	304,945,675	139,405,708	1,344,903,198	1,157,010,946	187,892,252
1898	325,452,134	146,804,522	1,462,651,318	1,245,788,245	216,863,073
1899	365,368,062	159,987,686	1,595,208,408	1,365,873,943	229,334,465
1900	400,603,257	168,687,601	1,742,414,173	1,493,378,709	249,035,464
1901	457,965,754	192,398,489	1,910,784,985	1,640,289,306	270,495,679
1902	504,527,705	199,883,721	2,091,822,851	1,796,136,861	293,685,990
1903	553,639,900	225,842,072	2,265,221,193	1,978,823,571	286,397,622
1904	599,081,882	247,052,831	2,498,960,968	2,168,468,541	330,492,427
1905	642,058,530	264,968,883	2,706,186,867	2,372,573,020	333,613,847
1906	667,185,592	287,325,629	2,924,253,848	2,557,049,863	367,203,985
1907	678,688,362	309,699,025	3,052,775,519	2,736,336,068	316,439,451

TABLE 17.—STATISTICS OF AMOUNTS PAID ON ACCOUNT OF ANNUITY CONTRACTS BY AMERICAN LEGAL RESERVE LIFE INSURANCE COMPANIES, 1878-1907.

(From the Insurance Age, 1908, pp. 272, 273.)

Years.	Amounts.	Years.	Amounts.	Years.	Amounts.
	<i>Dollars.</i>		<i>Dollars.</i>		<i>Dollars.</i>
1878	232,341	1888	1,297,943	1898	3,353,274
1879	256,081	1889	1,540,664	1899	3,553,453
1880	338,775	1890	1,797,965	1900	4,096,766
1881	483,609	1891	1,988,585	1901	4,324,305
1882	604,380	1892	2,097,427	1902	4,843,853
1883	831,617	1893	2,241,926	1903	5,517,851
1884	1,009,137	1894	2,328,166	1904	6,010,910
1885	1,075,287	1895	2,388,135	1905	6,536,777
1886	1,119,923	1896	2,608,874	1906	6,849,219
1887	1,204,661	1897	2,966,417	1907	7,011,861

TABLE 18.—STATISTICS OF FRATERNAL INSURANCE IN THE UNITED STATES, 1901-1907.*

(From the *Spectator Year Book*, 1908, p. 626.)

Years.	Number of Orders.	Number of Certificates in Force.	Amount of Insurance in Force.	Total Income.	Claim Payments.	Accumulated Assets.
			<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
1901 . . .	489	4,518,955	5,656,453,465	81,628,596	64,128,047	29,427,114
1902 . . .	580	4,947,370	6,115,735,000	84,399,411	68,264,767	36,182,172
1903 . . .	509	5,644,619	6,606,608,321	84,945,760	66,396,497	44,000,487
1904 . . .	575	6,054,296	7,273,069,328	89,482,424	73,050,155	52,525,100
1905 . . .	570	6,118,938	8,150,350,736	95,675,423	72,551,897	64,491,954
1906 . . .	590	6,890,564	8,136,201,919	109,452,736	80,907,670	76,502,396
1907 . . .	543	7,282,416	8,079,743,281	116,699,392	81,633,093	85,544,461

* These statistics are not entirely complete, since many small organizations make no reports.

TABLE 19.—STATISTICS OF THE SAVINGS-BANKS OF THE UNITED STATES, 1830-1907.

(From the *Statistical Abstract for 1907*.)

Years.	Number of Depositors.	Amounts on Deposit.	Years.	Number of Depositors.	Amounts on Deposit.
		<i>Dollars.</i>			<i>Dollars.</i>
1830	38,035	6,973,304	1878	2,400,785	879,897,425
1840	78,701	14,051,520	1879	2,268,707	802,490,298
1850	251,354	43,431,130	1880	2,335,582	819,106,973
1851	277,148	50,457,913	1881	2,528,749	891,961,142
1852	308,863	59,467,453	1882	2,710,354	966,797,081
1853	365,538	72,313,696	1883	2,876,438	1,024,856,787
1854	396,173	77,823,906	1884	3,015,151	1,073,294,955
1855	431,602	84,290,076	1885	3,071,495	1,095,172,147
1856	487,986	95,598,230	1886	3,158,950	1,141,530,578
1857	490,428	98,512,968	1887	3,418,013	1,235,247,371
1858	538,840	108,438,287	1888	3,838,291	1,364,196,550
1859	622,556	128,657,901	1889	4,021,523	1,444,391,325
1860	693,870	149,277,504	1890	4,258,893	1,550,023,956
1861	694,487	146,729,882	1891	4,533,217	1,654,826,142
1862	787,943	169,434,540	1892	4,781,605	1,758,329,618
1863	887,096	206,235,202	1893	4,830,599	1,808,800,262
1864	976,025	236,280,401	1894	4,777,687	1,777,833,242
1865	980,844	242,619,382	1895	4,875,519	1,844,357,798
1866	1,067,061	282,455,794	1896	5,065,494	1,935,466,468
1867	1,188,202	337,009,452	1897	5,201,132	1,983,413,564
1868	1,310,144	392,781,813	1898	5,385,746	2,028,208,409
1869	1,466,684	457,675,050	1899	5,687,818	2,182,006,424
1870	1,630,846	549,874,358	1900	6,107,083	2,389,719,954
1871	1,902,047	650,745,442	1901	6,358,723	2,516,843,293
1872	1,992,925	735,046,805	1902	6,666,672	2,650,104,486
1873	2,185,832	802,363,609	1903	7,035,228	2,815,483,106
1874	2,293,401	864,556,902	1904	7,305,443	2,918,775,329
1875	2,359,864	924,037,304	1905	7,696,229	3,093,077,357
1876	2,368,630	941,350,255	1906	8,027,192	3,299,544,601
1877	2,395,314	866,218,306	1907	8,588,811	3,495,410,087

TABLE 20.—SPECIMEN PREMIUM RATES OF THE MASSACHUSETTS SAVINGS-BANKS INSURANCE AND ANNUITY PLAN.

INSURANCE AND ANNUITY POLICY.

Insurance Payable at Death Prior to Age 65, Annuity commencing at Age 65.

Age next Birth- day.	Amount of Insurance and Annuity for Monthly Premium of											
	25c.		30c.		35c.		40c.		45c.		50c.	
	Ins.	Ann.	Ins.	Ann.	Ins.	Ann.	Ins.	Ann.	Ins.	Ann.	Ins.	Ann.
18 . .	\$124	\$24	\$149	\$30	\$174	\$34	\$198	\$39	\$223	\$44	\$248	\$49
19 . .	119	24	144	29	168	33	190	38	214	43	238	48
20 . .	115	23	138	28	161	32	184	37	207	41	230	46
21 . .	111	22	133	27	155	31	178	36	200	40	222	44
22 . .	107	21	128	26	150	30	171	34	193	39	214	43
23 . .	103	20	124	25	144	29	165	33	185	37	206	41
24 . .	100	20	120	24	140	28	160	32	180	36	200	40
25 . .	96	19	115	23	134	28	154	31	173	35	192	38
26 . .	93	18	112	22	130	26	149	29	168	33	186	37
27 . .	89	17	107	21	125	25	142	28	160	32	178	36
28 . .	86	17	103	21	120	24	138	28	155	31	172	34
29 . .	83	16	100	20	116	23	133	27	149	30	166	33
30 . .	80	16	96	19	112	22	128	26	144	29	160	32
31 . .	77	15	92	18	108	21	123	25	139	28	154	31
32 . .	74	14	89	18	104	21	118	24	133	27	148	30
33 . .	71	14	85	17	99	20	114	23	128	25	142	28
34 . .	68	13	82	16	95	19	109	22	122	24	136	27
35 . .	65	13	78	16	91	18	104	21	117	23	130	26
36 . .	62	12	74	15	87	17	99	20	112	22	124	25
37 . .	60	12	72	14	84	17	96	19	108	21	120	24
38 . .	57	11	68	14	80	16	91	18	103	20	114	23
39 . .	54	10	65	13	76	15	86	17	97	19	108	22
40 . .	51	10	62	12	71	14	83	16	92	18	102	21
41 . .	49	9	59	12	69	14	78	16	88	18	98	20
42 . .	46	9	55	11	64	13	74	15	83	17	92	19
43 . .	44	8	53	11	62	12	70	14	79	16	88	18
44 . .	41	8	49	10	57	11	66	13	74	15	82	17
45 . .	39	7	47	10	55	11	62	12	70	14	78	16
46 . .	36	7	43	9	50	10	58	12	65	13	72	15
47 . .	34	6	41	8	48	10	54	11	61	12	68	14
48 . .	32	6	38	8	45	9	51	10	58	12	64	13
49 . .	30	6	36	7	42	8	48	10	54	11	60	12
50 . .	27	5	32	6	38	7	43	9	49	10	54	11

TABLE 21.—SPECIMEN PREMIUM RATES OF THE MASSACHUSETTS SAVINGS-BANKS INSURANCE AND ANNUITY PLAN.

WHOLE LIFE POLICY.

Benefit Payable at Death. Premiums cease at Age 75.

Age next Birthday.	Amount of Insurance for Monthly Premium of											
	25c.	30c.	35c.	40c.	45c.	50c.	55c.	60c.	65c.	70c.	75c.	80c.
18	\$155	\$186	\$217	\$248	\$279	\$310	\$341	\$372	\$403	\$434	\$465	\$496
19	151	181	211	242	272	302	332	362	393	423	453	483
20	145	174	203	232	261	290	319	348	377	406	435	464
21	141	169	197	226	254	282	310	338	367	395	423	451
22	137	164	192	219	247	274	301	329	356	384	411	438
23	133	160	186	213	239	266	293	319	346	372	399	426
24	130	156	182	208	234	260	286	312	338	364	390	416
25	126	151	176	202	227	252	277	302	328	353	378	403
26	122	146	171	195	220	244	268	293	317	342	366	390
27	118	142	165	189	212	236	260	283	307	330	354	378
28	115	138	161	184	207	230	253	276	299	322	345	368
29	112	134	157	179	202	224	246	269	291	314	336	358
30	109	131	153	174	196	218	240	262	283	305	327	349
31	105	126	147	168	189	210	231	252	273	294	315	336
32	102	122	143	163	184	204	224	245	265	286	306	326
33	100	120	140	160	180	200	220	240	260	280	300	320
34	97	116	136	155	175	194	213	233	252	272	291	310
35	94	113	132	150	169	188	207	226	244	263	282	301
36	91	109	127	146	164	182	200	218	237	255	273	291
37	88	106	123	141	158	176	194	211	229	246	264	282
38	85	102	119	136	153	170	187	204	221	238	255	272
39	82	98	115	131	148	164	180	197	213	230	246	262
40	79	95	111	126	142	158	174	190	205	221	237	253
41	76	91	106	122	137	152	167	182	198	213	228	243
42	74	89	104	118	133	148	163	178	192	207	222	237
43	71	85	99	114	128	142	156	170	185	199	213	227
44	68	82	95	109	122	136	150	163	177	190	204	218
45	65	78	91	104	117	130	143	156	169	182	195	208
46	63	76	88	101	113	126	139	151	164	176	189	202
47	60	72	84	96	108	120	132	144	156	168	180	192
48	58	70	81	93	104	116	128	139	151	162	174	186
49	55	66	77	88	99	110	121	132	143	154	165	176
50	53	64	74	85	95	106	117	127	138	148	159	170
51	50	60	70	80	90	100	110	120	130	140	150	160
52	48	58	67	77	86	96	106	115	125	134	144	154
53	46	55	64	74	83	92	101	110	120	129	138	147
54	43	52	60	69	77	86	95	103	112	120	129	138
55	41	49	57	66	74	82	90	98	107	115	123	131
56	39	47	55	62	70	78	86	94	101	109	117	125
57	37	44	52	59	67	74	81	89	96	104	111	118
58	35	42	49	56	63	70	77	84	91	98	105	112
59	33	40	46	53	59	66	73	79	86	92	99	106
60	31	37	43	50	56	62	68	74	81	87	93	99

TABLE 22.—SPECIMEN PREMIUM RATES OF THE MASSACHUSETTS SAVINGS-BANKS INSURANCE AND ANNUITY PLAN.

ENDOWMENT POLICY.

Benefit Payable at Age 65 or at Previous Death.

Age next Birthday.	Amount of Endowment Insurance for Monthly Premium of											
	25c.	30c.	35c.	40c.	45c.	50c.	55c.	60c.	65c.	70c.	75c.	80c.
18	\$142	\$170	\$199	\$227	\$256	\$284	\$312	\$341	\$369	\$398	\$426	\$454
19	137	164	192	219	247	274	301	329	356	384	411	438
20	132	158	185	211	238	264	290	317	343	370	396	422
21	128	154	179	205	230	256	282	307	333	358	384	410
22	124	149	174	198	223	248	273	298	322	347	372	397
23	120	144	168	192	216	240	264	288	312	336	360	384
24	116	139	162	186	209	232	255	278	302	325	348	371
25	112	134	157	179	202	224	246	269	291	314	336	358
26	108	130	151	173	194	216	238	259	281	302	324	346
27	105	126	147	168	189	210	231	252	273	294	315	336
28	101	121	141	162	182	202	222	242	263	283	303	323
29	98	118	137	157	176	196	216	235	255	274	294	314
30	95	114	133	152	171	190	209	228	247	266	285	304
31	92	110	129	147	166	184	202	221	239	258	276	294
32	88	106	123	141	158	176	194	211	229	246	264	282
33	85	102	119	136	153	170	187	204	221	238	255	272
34	82	98	115	131	148	164	180	197	213	230	246	262
35	79	95	111	126	142	158	174	190	205	221	237	253
36	76	91	106	122	137	152	167	182	198	213	228	243
37	73	88	102	117	131	146	161	175	190	204	219	234
38	70	84	98	112	126	140	154	168	182	196	210	224
39	67	80	94	107	121	134	147	161	174	188	201	214
40	64	77	90	102	115	128	141	154	166	179	192	205
41	61	73	85	98	110	122	134	146	159	171	183	195
42	58	70	81	93	104	116	128	139	151	162	174	186
43	55	66	77	88	99	110	121	132	143	154	165	176
44	53	64	74	85	95	106	117	127	138	148	159	170
45	50	60	70	80	90	100	110	120	130	140	150	160
46	47	56	66	75	85	94	103	113	122	132	141	150
47	44	53	62	70	79	88	97	106	114	123	132	141
48	42	50	59	67	76	84	92	101	109	118	126	134
49	39	47	55	62	70	78	86	94	101	109	117	125
50	37	44	52	59	67	74	81	89	96	104	111	118

TABLE 23.—CANADIAN GOVERNMENT DEFERRED ANNUITIES.

ANNUITIES TO BE PURCHASED BY A WEEKLY PAYMENT OF TWENTY-FIVE CENTS (\$13 A YEAR).

In the event of death before the first payment of annuity falls due, the total purchase money, with 3 per cent. compound interest, will be refunded.

Age Last Birthday.	Amount of Annuity—Payable Quarterly at			
	Age 65.		Age 70.	
	Males.	Females.	Males.	Females.
5	\$427.51	\$371.57	—	—
10	335.73	292.50	\$559.08	\$471.44
15	262.23	229.03	434.94	368.77
20	203.52	178.20	336.66	287.07
25	156.63	137.51	258.95	222.11
30	119.17	104.89	197.52	170.43
35	89.22	78.73	148.97	129.33
40	65.25	57.74	110.59	96.62
45	46.04	40.85	80.25	70.55
50	30.62	27.25	56.24	49.74
55	18.21	16.24	37.19	33.07
60	8.17	7.30	22.01	19.66
65	—	—	9.85	8.82

TABLE 24.—CANADIAN GOVERNMENT DEFERRED ANNUITIES.

ANNUITIES TO BE PURCHASED BY A WEEKLY PAYMENT OF TWENTY-FIVE CENTS (\$13 A YEAR).

In the event of death before the first payment of annuity falls due, no purchase money will be refunded.

Age Last Birthday.	Amount of Annuity—Payable Quarterly at			
	Age 65.		Age 70.	
	Males.	Females.	Males.	Females.
5	—	\$553.73	—	—
10	\$517.21	432.69	—	—
15	401.24	335.70	—	\$598.15
20	307.88	257.63	\$589.94	461.33
25	233.30	195.28	449.83	352.08
30	174.06	145.73	338.55	265.25
35	127.18	106.49	250.47	196.48
40	90.23	75.58	181.06	142.32
45	61.31	51.44	126.73	100.02
50	38.90	32.80	84.63	67.35
55	21.81	18.58	52.53	42.43
60	9.10	7.89	28.65	23.70
65	—	—	11.55	9.87

TABLE 25.—CANADIAN GOVERNMENT DEFERRED ANNUITIES.

YEARLY PAYMENTS REQUIRED TO PURCHASE AN ANNUITY OF \$100.

In the event of death before the first payment of annuity falls due, the total purchase money, with 3 per cent. compound interest, will be refunded.

Age Last Birthday.	Yearly Payments for \$100 Annuity at			
	Age 65.		Age 70.	
	Males.	Females.	Males.	Females.
5	\$3.04	\$3.50	\$1.82	\$2.17
10	3.87	4.44	2.33	2.76
15	4.96	5.68	2.99	3.53
20	6.39	7.30	3.86	4.53
25	8.30	9.45	5.02	5.85
30	10.91	12.39	6.58	7.63
35	14.57	16.51	8.73	10.05
40	19.92	22.52	11.76	13.46
45	28.24	31.82	16.20	18.43
50	42.45	47.72	23.12	26.14
55	71.40	80.05	34.96	39.31
60	159.17	178.12	59.06	66.13
65	—	—	132.00	147.43

TABLE 26.—CANADIAN GOVERNMENT DEFERRED ANNUITIES.

YEARLY PAYMENTS REQUIRED TO PURCHASE AN ANNUITY OF \$100.

In the event of death before the first payment of annuity falls due, no purchase money will be refunded.

Age Last Birthday.	Yearly Payments for \$100 Annuity at			
	Age 65.		Age 70.	
	Males.	Females.	Males.	Females.
5	\$1.96	\$2.35	\$1.04	\$1.33
10	2.51	3.00	1.32	1.69
15	3.24	3.87	1.70	2.17
20	4.22	5.05	2.20	2.82
25	5.57	6.66	2.89	3.69
30	7.47	8.92	3.84	4.90
35	10.22	12.21	5.19	6.62
40	14.41	17.20	7.18	9.13
45	21.20	25.27	10.26	13.00
50	33.42	39.63	15.36	19.30
55	59.59	69.96	24.75	30.64
60	142.81	164.72	45.38	54.85
65	—	—	112.59	131.70

TABLE 27.—IMMEDIATE ANNUITIES—MALE AND FEMALE.

RATES OF THE PRUDENTIAL INSURANCE COMPANY OF AMERICA.

Annuity Purchased by Payment of 1,000 Dollars.

Age Last Birthday.	Males.			Females.		
	Annual Payment.	Semi- annual Payment.	Quarterly Payment.	Annual Payment.	Semi- annual Payment.	Quarterly Payment.
25 . . .	\$49.83	\$24.61	\$12.23	\$47.28	\$23.36	\$11.61
26 . . .	50.25	24.81	12.33	47.66	23.55	11.71
27 . . .	50.68	25.03	12.44	48.08	23.75	11.81
28 . . .	51.15	25.25	12.55	48.50	23.96	11.91
29 . . .	51.63	25.48	12.66	48.92	24.17	12.01
30 . . .	52.14	25.73	12.79	49.38	24.39	12.12
31 . . .	52.69	26.00	12.92	49.85	24.62	12.24
32 . . .	53.25	26.27	13.05	50.33	24.85	12.35
33 . . .	53.85	26.57	13.20	50.81	25.09	12.47
34 . . .	54.50	26.88	13.35	51.31	25.33	12.59
35 . . .	55.16	27.20	13.51	51.84	25.59	12.71
36 . . .	55.83	27.53	13.67	52.38	25.85	12.84
37 . . .	56.59	27.90	13.86	52.94	26.12	12.98
38 . . .	57.37	28.28	14.04	53.56	26.43	13.13
39 . . .	58.21	28.69	14.24	54.20	26.74	13.28
40 . . .	59.07	29.10	14.45	54.88	27.07	13.45
41 . . .	59.99	29.55	14.67	55.62	27.43	13.62
42 . . .	60.98	30.03	14.90	56.37	27.79	13.80
43 . . .	62.00	30.53	15.15	57.21	28.20	14.00
44 . . .	63.09	31.06	15.41	58.07	28.62	14.21
45 . . .	64.27	31.63	15.69	59.03	29.09	14.44
46 . . .	65.49	32.22	15.98	60.02	29.57	14.68
47 . . .	66.76	32.83	16.28	61.09	30.08	14.93
48 . . .	68.17	33.51	16.62	62.23	30.64	15.20
49 . . .	69.64	34.22	16.97	63.45	31.23	15.50
50 . . .	71.17	34.97	17.33	64.77	31.87	15.81
51 . . .	72.83	35.77	17.73	66.18	32.55	16.15
52 . . .	74.63	36.63	18.15	67.66	33.27	16.50
53 . . .	76.51	37.54	18.60	69.25	34.04	16.88
54 . . .	78.49	38.49	19.06	70.97	34.87	17.28
55 . . .	80.65	39.53	19.57	72.78	35.74	17.71
56 . . .	82.92	40.62	20.11	74.74	36.68	18.18
57 . . .	85.40	41.81	20.69	76.86	37.71	18.68
58 . . .	88.03	43.07	21.31	79.11	38.79	19.21
59 . . .	90.83	44.40	21.96	81.50	39.94	19.77
60 . . .	93.81	45.83	22.66	84.10	41.19	20.38
61 . . .	96.99	47.35	23.40	86.88	42.52	21.04
62 . . .	100.50	49.02	24.21	89.85	43.94	21.73
63 . . .	104.28	50.81	25.09	93.02	45.45	22.47
64 . . .	108.34	52.74	26.03	96.43	47.08	23.27
65 . . .	112.61	54.76	27.01	100.00	48.78	24.10
66 . . .	116.82	56.75	27.98	103.84	50.61	24.99
67 . . .	121.21	58.82	28.99	107.76	52.47	25.89
68 . . .	125.63	60.90	30.00	111.98	54.47	26.87
69 . . .	130.21	63.05	31.04	116.28	56.50	27.86
70 . . .	134.77	65.19	32.07	120.77	58.62	28.89
71 . . .	139.47	67.39	33.14	125.47	60.83	29.96
72 . . .	144.09	69.54	34.18	130.21	63.05	31.04
73 . . .	149.03	71.84	35.29	135.14	65.36	32.16
74 . . .	153.85	74.07	36.36	140.06	67.66	33.27
75 . . .	158.73	76.34	37.45	144.93	69.93	34.37
76 . . .	163.93	78.74	38.61	149.70	72.15	35.44
77 . . .	168.92	81.04	39.72	154.56	74.40	36.52
78 . . .	174.22	83.47	40.88	159.24	76.57	37.57
79 . . .	179.21	85.76	41.98	163.93	78.74	38.61
80 . . .	184.16	88.03	43.07	168.92	81.04	39.72
81 . . .	189.39	90.42	44.21	174.22	83.47	40.88
82 . . .	194.93	92.94	45.41	179.86	86.06	42.12
83 . . .	200.80	95.60	46.69	185.87	88.81	43.44
84 . . .	207.04	98.43	48.03	192.31	91.74	44.84
85 . . .	213.68	101.42	49.46	199.20	94.88	46.34

TABLE 28.—SPECIMEN PREMIUM RATES—MONTHLY INCOME POLICY.

ANNUAL PREMIUMS FOR AN INCOME OF \$10 PER MONTH FOR TWENTY YEARS.
(NON-PARTICIPATING.)*Issued by the Prudential Insurance Company of America.*

Age.	Whole Life.	10-Payment Life.	15-Payment Life.	20-Payment Life.	10-Year Endowment.	15-Year Endowment.	20-Year Endowment.
20	\$26.24	\$64.63	\$47.83	\$39.64	\$161.00	\$102.03	\$73.26
25	29.41	70.16	51.99	43.13	161.44	102.56	73.90
30	33.47	76.81	57.01	47.39	162.05	103.28	74.77
35	38.76	84.77	63.07	52.62	162.95	104.38	76.16
40	45.76	94.38	70.53	59.16	164.33	106.15	78.46
45	55.20	106.01	79.82	67.62	166.67	109.24	82.46
50	68.11	120.32	91.77	78.91	170.80	114.64	89.35
55	85.91	137.97	107.36	94.38	177.87	123.78	100.87
60	110.64	160.16	128.41	116.24	189.62	138.99	119.55

NOTE.—For a monthly income of a greater amount than \$10 the premium charged would be correspondingly greater. For example: To get the rate for a monthly income of \$20, multiply the above figures by two; of \$25, multiply by two and one-half; of \$50, by five, and so on. This policy provides for dependent survivors for a period of twenty years, and for self-support in old age in the case of endowment policies. Under this plan, instead of paying the amount of insurance in one sum on the death of the insured or on the maturity of the policy, a monthly sum of \$10, or multiples thereof, is paid for a period of twenty years.

TABLE 29.—SPECIMEN PREMIUM RATES—CONTINUOUS MONTHLY INCOME POLICY.

ANNUAL PREMIUMS FOR AN INCOME OF \$10 PER MONTH FOR TWENTY YEARS, OR SO LONG THEREAFTER AS THE BENEFICIARY SHALL LIVE. (NON-PARTICIPATING.)

Issued by the Prudential Insurance Company of America.

Age of Insured.	Whole Life.		20-Payment Life.		20-Year Endowment.	
	Beneficiary Same Age as Insured.	Beneficiary Five Years Younger than Insured.	Beneficiary Same Age as Insured.	Beneficiary Five Years Younger than Insured.	Beneficiary Same Age as Insured.	Beneficiary Five Years Younger than Insured.
20	\$32.19	\$33.25	\$47.70	\$49.24	\$102.66	\$105.92
25	34.81	35.99	50.19	51.89	97.68	101.38
30	38.25	39.59	53.41	55.24	92.57	96.58
35	42.89	44.38	57.61	59.53	88.18	92.21
40	49.24	50.85	63.14	65.14	85.68	89.31
45	58.01	59.74	70.67	72.68	86.47	89.39
50	70.25	72.05	81.12	83.06	91.66	93.91
55	87.35	89.10	95.82	97.62	102.31	104.13
60	111.41	112.90	117.01	118.50	120.32	121.81
65	145.60	146.59	148.23	149.22	149.42	150.41

Under this form of policy the monthly income, instead of being for a period of twenty years, is made continuous for the subsequent lifetime of the beneficiary. In other words, the monthly income is paid for twenty years in any event, but, if the beneficiary lives beyond the twenty-year period, the amount is paid for as many years thereafter as he or she may live.

MASSACHUSETTS SAVINGS-BANK INSURANCE AND PENSION SYSTEM.

By LOUIS D. BRANDEIS.

Massachusetts offers in its savings-bank insurance and pension system a partial solution of the problem of providing for the superannuated workingman. Unlike Germany, Massachusetts seeks to secure for her wage-earners voluntary instead of compulsory old age insurance. Unlike England, Massachusetts plans to make her superannuated workingmen independent instead of dependent, and to relieve instead of further burdening general taxation. She seeks to do this by creating the most efficient and inexpensive instrument for providing old age insurance,—to make saving by way of old age insurance popular by giving to the saver all that his money can earn, and to make the opportunities for saving the workingman's money as numerous as are the opportunities for wasting it.

The Massachusetts system of savings-bank insurance and annuities was made possible by Chapter 561 of the Acts of 1907, which authorized any savings-bank to establish under proper safeguards an insurance department for the issue to residents of Massachusetts of legal reserve life insurance limited to \$500 and annuities limited to \$200 a year on any one life. The Act, however, permits the same person to take out life insurance and annuities from more than one bank.

The purposes of the Act are:—

First. To give to Massachusetts wage-earners an opportunity to secure safe life insurance at the lowest possible cost as a substitute for industrial life insurance, on which the expense of conducting the business is about 40 per cent. of the premiums paid.

Second. To give to Massachusetts wage-earners an opportu-

ity to make provision for their old age by the purchase, out of current earnings, of annuities at the lowest possible cost.

The low cost of life insurance and annuities offered under the Massachusetts savings-bank system is attained:—

1. By eliminating entirely the paid solicitor of insurance and house-to-house collector of premiums.

2. By eliminating the cost of actuarial services and general medical supervision, this work being done by the State Actuary and State Medical Director for all savings insurance banks, without charge to the bank.

3. By utilizing the high net earning capacity of the savings-banks for investing funds.

4. By substituting for the paid solicitor and collector numerous unpaid agencies through which applications for insurance and annuities may be made and at which premiums may be paid.

Under the savings-bank insurance and annuity act the goodwill, organization, and efficiency of the savings-banks, developed in nearly a century of honorable service, are applied in furnishing opportunities for the other forms of saving more recently developed; namely, life insurance and old age annuities.

The Massachusetts savings-banks have no stockholders. Their trustees—generally men of high character and of large experience—serve substantially without pay, recognizing that the business of collecting and investing the savings of persons of small means is a *quasi*-public trust. The savings-banks are conducted by their officials as beneficent and not as selfish money-making institutions. They have a long record of large earnings on deposits and of small expenses of management. Though the character of permissible investments is narrowly limited by law to insure safety, these banks earned gross during the last ten years an average of 4.65 per cent. on deposits, while the average expense of management was less than $\frac{1}{4}$ of 1 per cent.

The opportunities for safe and profitable investment afforded by the savings-banks have done much to make saving popular in Massachusetts, and account in a large degree for the pros-

perity of the Commonwealth. With a population of little more than three million people, Massachusetts has developed in her 189 savings-banks 1,973,926 separate deposit accounts, aggregating \$709,519,730, the average amount of each account being \$359.45. It is expected that the insurance department of the banks will in time become equally popular. The essential conditions under which the two departments are conducted are the same. In each department all the profits are applied to or for the benefit solely of those who intrust their savings to the bank.

Each savings-bank, through its trustees and incorporators, decides for itself whether it will extend its functions so as to include the issuance of annuities and life insurance. Likewise, each bank decides for itself whether it will engage in the annuity and insurance business on its own account or consent to act as agent for some other bank.

It is probable that for the present only a few of the savings-banks will establish an independent insurance department, and that the larger number of banks will act merely as agencies, because of the special guaranty fund provisions in the law.

No savings-bank may establish an insurance department until there has been provided for it a special guaranty fund to an amount approved by the State Actuary, which may not be less than \$25,000 for any bank. This guaranty fund, which would have to be raised by contributions from public-spirited persons, is placed at the risk of the business, to be repaid ultimately out of profits of the insurance department, with interest at the same rate as is paid by the savings-bank upon its savings deposits. Besides this special guaranty fund of the individual savings insurance bank, the law provides for a general guaranty fund derived through an assessment of 4 per cent. upon all premiums received by any of the banks. The funds so contributed are held as a guaranty for all obligations on policies or annuity contracts of the insurance departments of any of the savings and insurance banks. The safety of the insurance and annuity contracts is thus assured not only by the efficient supervision of

the Insurance Commissioner, the Bank Commissioner, and the State Actuary, but also by special and general guaranty funds.

While the law prohibits savings-banks from employing paid solicitors and collectors, it provides in the amplest manner for the solicitation of insurance and the collection of premiums through the establishment of private agencies. The plan contemplates that ultimately every large or fairly large employer of labor in the Commonwealth shall become an agency for some savings insurance bank; that agencies shall in the same manner be established with trade-unions and other workingmen's mutual benefit societies and with such welfare institutions as the Young's Men Christian Association and the settlement houses.

Through this system of unpaid agencies the work of solicitation will be done. For, while the savings-banks may at their own offices receive applications for insurance and premiums, it is not expected that more than a small percentage of the business will be done at the bank. The agencies will be the effective instrument for placing the insurance and for collecting premiums. Through the agency system the savings insurance bank will in effect go where the wage-earner and his money is instead of expecting the wage-earner to bring it to the bank. Through the agency system the payment of the individual premiums can be made practically automatic, so far as the insured is concerned, by his giving to his employer a standing order to deduct the amount of the insurance premium from his wages. The employer will then transmit monthly an amount equal to the premiums of all employees who have authorized this method of payment. On the other hand, where the policy holder deals directly with the bank, and has a deposit account with the bank, he may give a standing order to the bank to charge to his deposit account the monthly premiums required for his insurance or annuity policy.

The savings-bank organization supplies practically only one of the three factors in the insurance and annuity business. The bank serves by its good-will to attract business, and re-

ceives, invests, pays out, and accounts for the money; but the business itself is obtained, and the premiums are collected, mainly through the agencies. On the other hand, the technical insurance work—that of the actuarial department and the medical supervising department—is performed by the State officers; the State furnishing policy and other forms and the books of account, as well as the services of these experts, without charge. Thus the savings-bank performs for its insurance and annuity department, in the main, but little in addition to the same service that it does for its deposit department.

The relatively low cost of the insurance thus furnished by the Massachusetts savings-bank system is shown in a pamphlet* recently published by the State Actuary, from which it appears that, under the savings-bank system, the old age annuity plus life insurance may cost less than the workingman now pays for his industrial life insurance alone:

“Suppose you are twenty-five years old and pay to the savings-bank \$1.30 each month, and your neighbor, who is the same age, pays \$1.35 each month to the insurance company. When you reach age sixty-five, you will have no more deposits to make. Instead of making deposits, you will begin to receive an annuity of \$100. While you are enjoying the fruits of your saving, your neighbor will still be paying \$1.35 every month to the insurance company, and he will have to continue paying this amount until he is seventy-five years old. Which would you rather be,—your neighbor or yourself?”

The savings-bank policies have other advantages besides the lower rate. They are participating policies, while the industrial insurance policies are non-participating. The savings-bank policies provide for “full immediate benefit,”—that is, payment of the face of the policy in case the insured dies at any time after the date of the policy; while the industrial insurance policies provide for payment of only one-half the face of the policy in case of death within six months after the date of the policy. Furthermore, the savings-bank life insurance policy is non-forfeitable for failure to pay premium after six monthly premiums have been paid, whereas the industrial insurance

* See table on page 416.

policies lapse in case of failure to pay premium at any time within the first three years.

The Massachusetts savings-bank insurance and pension system was first put into operation on June 18, 1908, when the savings-bank of Whitman—a prosperous manufacturing town in South-eastern Massachusetts—opened the first insurance department established under the statute.

In November, 1908, the People's Savings Bank of Brockton—of which ex-Governor William L. Douglas is president—established its insurance department. Other savings-banks—those at Bridgewater, Ware, and Ludlow, all manufacturing communities—have taken agencies from the Whitman bank; and at least six other banks have now under consideration either the establishment of insurance departments or the taking of agencies.

Both the Whitman Savings Bank and the People's Savings Bank of Brockton have numerous private agencies, including manufacturers, mercantile establishments, labor unions, and welfare institutions. In this manner private agencies have already been established in Boston, Cambridge, Springfield, Lowell, Haverhill, Middleboro, North Abington, Norwood, and South Framingham.

The Massachusetts insurance and pension system can attain success only through the full appreciation by the employee, the employer, and the community that provision for old age and life insurance is an integral part of the daily cost of living; that no wage is a living wage which does not permit the workingman to set apart each day or week or month the necessary cost of such provision for the future; that no workingman can be truly self-supporting or independent who does not make such provision; and that the savings-bank will enable him to make the provision at the lowest possible cost.

To make general the appreciation of these facts involves an extensive, persistent, and long-continued campaign of education. This educational work was commenced in the fall of 1906 by the Massachusetts Savings Insurance League, when the project of savings-bank insurance was first submitted to the pub-

lic. The long strenuous campaign which preceded the passage of the Act resulted in a wide discussion of the subject in every part of the State. Nearly 300 labor unions joined in the effort to secure the requisite legislation. Presidents of the State Branch of the American Federation of Labor, of the Boston Central Labor Union, of the International Boot and Shoe Workers' Union, and the International Textile Workers' Union, thus representing Massachusetts' leading industries, were among its most enthusiastic supporters. Leading manufacturers, financiers, and social workers then gave the movement their support, and the educational work commenced has been continued ever since and has been much enlarged. In this educational work, employers, employees, social workers, and the churches are all taking part, and upon this wide-spread and concerted effort rests the confidence in the success of the system.

* INSURANCE AND ANNUITY POLICY.

INSURANCE PAYABLE AT DEATH PRIOR TO AGE SIXTY-FIVE, ANNUITY COMMENCING AT AGE SIXTY-FIVE.

The figures below show the most you will have to pay and the least you will get. All the profits go to the policy holders.

Age Next Birthday.	Amount of Insurance and Annuity for Monthly Premium of									
	Premium, 25 cents.		Premium, 50 cents.		Premium, 75 cents.		Premium, \$1.		Premium, \$1.25.	
	Insur- ance.	Annu- ity.	Insur- ance.	Annu- ity.	Insur- ance.	Annu- ity.	Insur- ance.	Annu- ity.	Insur- ance.	Annu- ity.
18	\$124	\$24	\$248	\$49	\$372	\$75	\$496	\$99	—	—
19	119	24	238	48	357	72	476	95	—	—
20	115	23	230	46	345	69	460	92	—	—
21	111	22	222	44	333	67	444	89	—	—
22	107	21	214	43	321	64	428	86	—	—
23	103	20	206	41	309	62	412	82	—	—
24	100	20	200	40	300	60	400	80	\$500	\$100
25	96	19	192	38	288	58	384	77	480	96
26	93	18	186	37	279	56	372	74	465	93
27	89	17	178	36	267	54	356	71	445	89
28	86	17	172	34	258	52	344	69	430	86
29	83	16	166	33	249	50	332	66	415	83
30	80	16	160	32	240	48	320	64	400	80
31	77	15	154	31	231	46	308	62	385	77
32	74	14	148	30	222	44	296	60	370	74
33	71	14	142	28	213	43	284	57	355	71
34	68	13	136	27	204	41	272	54	340	68
35	65	13	130	26	195	39	260	52	325	65
36	62	12	124	25	186	37	248	50	310	62
37	60	12	120	24	180	36	240	48	300	60
38	57	11	114	23	171	34	228	46	285	57
39	54	10	108	22	162	33	216	43	270	54
40	51	10	102	21	153	31	204	41	255	51
41	49	9	98	20	147	29	196	39	245	49
42	46	9	92	19	138	28	184	37	230	46
43	44	8	88	18	132	26	176	35	220	44
44	41	8	82	17	123	25	164	33	205	41
45	39	7	78	16	117	23	156	31	195	39
46	36	7	72	15	108	22	144	29	180	36
47	34	6	68	14	102	20	136	27	170	34
48	32	6	64	13	96	18	128	26	160	32
49	30	6	60	12	90	18	120	24	150	30
50	27	5	54	11	81	16	108	22	135	27

THE WORK OF THE MASSACHUSETTS COMMISSION
ON OLD AGE PENSIONS.BY F. SPENCER BALDWIN, *Executive Secretary of the Commission.*

The Massachusetts Commission on Old Age Pensions, Annuities, and Insurance was appointed in 1907, under authorization of a legislative resolve "to investigate and consider the various systems of old age insurance, or old age pensions or annuities proposed or in operation in this Commonwealth, or elsewhere, and report upon the advisability of establishing an old age insurance or pension system in this Commonwealth." The Commission was further instructed to report "statistics showing the probable expense to the Commonwealth of the various systems considered, and of any system that they may recommend for adoption, together with any bills or other suggestions for legislation relating to this subject that they may deem wise." The report of the Commission was to be submitted on or before January 15, 1909. On January 1 of this year the Commission presented a preliminary report, and requested an extension of time for one year, in order to complete a statistical investigation that had been undertaken. This request was granted, and the life of the Commission was extended to January 15, 1910.*

Massachusetts is the first state to provide for an official inquiry into this subject. In 1905 the legislature of Illinois created a commission to "investigate and report to the governor the draft of a bill providing a plan for industrial insurance and workingmen's old age pension." This commission, however, confined its investigation to the subject of accident insurance of employees, leaving the question of old age pensions untouched. The Massachusetts investigation is thus

*The members of the Commission are Magnus W. Alexander, Chairman, James T. Buckley, M.D., Mrs. M. R. Hodder, Arthur M. Huddell, Walter G. Chase, M.D.

especially noteworthy as the pioneer undertaking of this kind in the United States.

The plan of investigation finally adopted by the Commission, after careful preliminary study of the subject of inquiry, is based on recognition of the need of statistical data regarding the number and the condition of potential pensioners in the state. Before any plan of old age pensions can be considered intelligently, with reference to adoption in Massachusetts, it is obviously necessary to know something about the approximate number of persons who would come under the provisions of the scheme, the probable cost of providing for them in the proposed manner, and the present condition of the pensionable population. In order to form an opinion regarding the expediency of introducing in Massachusetts any one of the old age pension schemes that have been adopted elsewhere, one must know, at least approximately, how large the proposed undertaking is, how much it would cost, and what the need or the demand for such a measure may be. In other words, how many persons would be entitled to share in the benefits of the plan? What would it cost to provide pensions for this number? What is the present cost of maintaining the dependent part of this population under the existing system of poor-relief? What saving, if any, in the expenditure for poor-relief would result from the adoption of the plan? What proportion of the aged population is in actual want,—that is, not properly provided for through income from earnings or savings, and assistance from children or other relatives? Information that will throw light on these questions is needed before judgment can be passed on the cost and need of any plan of old age pension or insurance.

At present there are no official statistics that give answers to these important questions. The results of statistical investigations in this field, carried on in Great Britain and various European countries, afford no secure basis for conclusions as to the cost, the scope, and the need of an old age pension scheme in Massachusetts, for the conditions in this state are widely different from those in foreign countries. Authorita-

tive determination of the concrete facts that are pertinent to intelligent consideration of the old age pension question in this state is clearly the first step toward a scientific solution of the problem. The investigation of the State Commission is designed to supply the needed statistical information.

In 1905 a report on old age pensions was issued by the State Bureau of Statistics of Labor, under the direction of the former Chief of the Bureau, Mr. Charles Felton Pidgin. The statistical matter presented in this report was, however, of dubious character. The statistics purported to show that the establishment of a pension system, providing \$260 a year for all persons over sixty-five years of age who made application for such pension, would save the state about \$2,000,000 a year. Mr. Pidgin arrived at this startling conclusion by calculating the net cost of the pension scheme on two assumptions: first, that only one person in five of pensionable age would apply for a pension; second, that the entire expenditure for charitable purposes by cities, towns, individuals, and societies would be abolished by the institution of a pension system. The amount required to pay pensions of \$260 a year to one-fifth of the population over sixty-five years of age was estimated by Mr. Pidgin to be \$7,441,564. The amount expended for charitable purposes by cities, towns, individuals, and societies was calculated at \$9,580,551.51. The following passage from the report states the two assumptions on which the estimate of the cost and the saving of the pension plan is based:*

Now it is not to be assumed that all persons sixty-five years of age or over would ask for the old-age pension. Many such persons are in affluence; others, and a much larger number, are in comfortable circumstances; many others are still able to work and support themselves or contribute to the support of their families; and quite a large number would be unable to obtain such a pension owing to their past manner of living. The experience of foreign countries has shown that not more than one-fifth of the persons beyond the age of sixty or sixty-five apply for the old-age pensions. As has been shown, the amount required to pay an annual pension of \$260 to one-fifth of the persons in the State

* Annual Report of the Bureau of Statistics of Labor, 1905, pp. 143-144.

sixty-five years of age or over is \$2,138,987.51 less than was contributed in the year 1900 by the cities and towns and by individuals and corporations for charitable purposes. If this plan were adopted, cities, towns, individuals, and corporate societies would be free from collecting and distributing money for charitable purposes.

The assumption that only one person in five of eligible age would apply for a pension of \$260 a year is palpably grotesque. There is nothing in the experience of other countries to warrant such an assumption. In New South Wales, for example, the percentage of the population over sixty-five years of age in receipt of pensions is about 45 per cent. There are 21,685 pensioners out of 47,426 persons of eligible age. In Great Britain the percentage of persons qualifying for pensions under the new pension act is about the same as in New South Wales,—45 per cent. There are 596,038 pensioners out of a population over seventy years of age of approximately 1,270,000. It should be remembered that in Great Britain, as in New South Wales, persons with incomes of more than a specified small amount, and also certain classes, such as criminals and paupers, are excluded from the benefits of the pension plan. If a universal pension, such as Mr. Pidgin proposed, were adopted in this state, it is reasonably certain that a large proportion of the population of eligible age would apply for pensions. If, however, only one-half of the age population applied, or if one-half were disqualified by various conditions of eligibility as in other countries, the cost would, nevertheless, exceed \$20,000,000 a year. The number of persons sixty-five years and over in the state is given in the census returns of 1905 as 161,918. One-half of that number is roundly 81,000. Pensions of \$260 a year for 81,000 persons would cost \$21,060,000 annually.

The other assumption made by Mr. Pidgin, that the total expenditure for poor-relief by cities, towns, individuals, and societies would be abolished by the adoption of a pension scheme, is manifestly extravagant. The theory is that, if you provide age pensions for all persons over sixty-five years of age, almshouses and almsgiving will become superfluous. This

theory overlooks the patent fact that poor-relief is not granted exclusively to the aged poor. A state cannot get rid of all its juvenile and adult dependents by merely pensioning the aged population.

As to the actual effect of a pension system on expenditure for poor-relief, the experience of European countries which have tried the pension policy shows that such expenditure tends to increase, rather than decline, after the pension system is established. The Preliminary Report of the Massachusetts Commission gives an analysis of the experience of Denmark and the Australasian Colonies of Great Britain, which illustrates this tendency. The statistics of the operation of the Danish system disclosed these striking facts:—

1. The number of recipients of old age relief has increased rapidly at the rate of 4 to 5 per cent. annually, while the population has grown only at the rate of one-half to 1 per cent. The number in 1893 was 43,826; in 1906, 68,831.

2. The expenditure has risen in even greater proportion. In 1893 the total was 2,963,086 kroner (\$741,000); in 1906, 7,666,000 kroner (\$1,914,000).

3. At the same time the expenditure for ordinary poor-relief has also increased in recent years. When the old age relief system was established, it was expected that the cost of poor-relief would decrease to some extent, if not proportionately to the grant of old age relief. For a few-years this expectation was realized. Since 1896, however, the amount expended for poor-relief has steadily increased, and in 1905 the amount thus expended exceeded the expenditure for 1890 by nearly 400,000 kroner (\$100,000).

A survey of the figures relating to the operation of the New Zealand act since its passage shows that the number of pensioners has increased steadily, but not with notable rapidity; that the amount paid in pensions has increased greatly, being in 1908 nearly three times as large as in 1899. The latter fact is due, in large measure, to the increase of the amount of the pension from £18 to £26 a year in 1905. The effect of the pension act on expenditure for poor relief has been to reduce some-

what the amount spent on outdoor relief. The expenditure for indoor relief, however, has increased notably since the act went into operation. Thus the total expenditure for poor-relief has risen considerably.

Concerning Victoria, Mr. H. W. Meakin, treasurer of the colony, states: "The introduction of the old age pension system in this State has had no appreciable effect on the charitable institutions."

The Australian Royal Commission of 1905 drew the following conclusions regarding the relation of a pension system to poor-relief in the colonies:—

The amounts voted for charities by the governments of New South Wales and Victoria, where old age pension acts are in existence, have not been appreciably reduced in consequence of the passing of these acts. . . . It has been shown that in numerous cases the granting of pensions, with the consequent removal of inmates from asylums, has been exceedingly harmful, and that many of them have drifted into most undesirable quarters and suffered neglect and privation."

These facts completely discredit the popular notion that the adoption of a pension system would mean "the passing of the poorhouse." It seems clear that, whatever benefits a pension system might or might not bring, it could not be expected to do away with almshouses and almsgiving. That, at least, is the lesson of foreign experience with pension systems.

The statistical investigation which the Commission has projected is designed, primarily, to show in a conclusive way the cost of applying in Massachusetts the various schemes of old age pensions proposed or tried in other countries, and, secondarily, to exhibit in considerable detail the financial, industrial, and social conditions of the aged population. For the purpose of such an investigation the population over sixty-five years of age may be divided conveniently into several classes.

First, the criminal and the insane. It is necessary to know the number of persons of pensionable age in correctional institutions and in hospitals and asylums for the insane, in order to determine the scope and the cost of any pension plan. In most schemes ad-

vocated or adopted, the members of this class would be debarred from the receipt of a pension. Furthermore, the criminal and the insane would still have to be maintained in institutions, even if a pension system were instituted. This class, therefore, does not require detailed investigation for the purposes of an investigation relating to old age pensions. The number of persons in this class must, however, be definitely determined in order to get at the proportion of the population of eligible age that would come under the provisions of a pension plan.

Second, the institutional poor. It is necessary to determine the number of persons of pensionable age in public and private charitable institutions, at a given date, and also the number admitted during the period of one year, as well as the number of deaths, discharges, and transfers during the year.

An investigation covering at least a period of twelve months is needed to show the full extent and movement of this institutional population. A mere "day count" would give only a partial indication of the burden imposed by this dependent class, and would afford an altogether inadequate basis for calculating the scope and the cost of any pension system. Such a calculation must be made on a year basis. It is necessary to know not only how many persons might come under the provisions of a pension scheme at any given date, but how many persons must be provided for in an operating year.

The particular information needed concerning this institutional population relates to the total cost of maintaining this class; the percentage of aliens, invalids, insane, criminals, and the like in this class, who would either be debarred from the receipt of a pension or would necessarily remain in institutions even if a pension scheme were adopted; the percentage of persons in this class who would be enabled by the grant of a pension to withdraw from institutional residence; the reduction, if any, in expenditure for institutional dependents to be expected from the adoption of a pension plan.

Third, the non-institutional poor. The number of persons of pensionable age who receive outdoor relief from public and

private sources during the period of one year must be ascertained. This non-institutional class must be studied in much the same way as the institutional class. Analysis of the facts to be gathered relating to the two classes of institutional and non-institutional poor will show the number of persons now resident in institutions, and dependent on charity, who would come under the provisions of a pension scheme, and the cost of providing for them in this way, as compared with the cost of supporting or assisting this population through public and private charity by present methods, and will thus enable one to estimate the comparative economy of a pension scheme in its bearing on the dependent portion of the population.

Fourth, the non-dependent poor. It is important to arrive at some estimate of the number of persons of pensionable age, not at present in receipt of indoor or outdoor relief, who would be entitled by reason of their poverty to share in the benefits of a pension plan. This class includes the proportion of the population of pensionable age just above the dependency line but below the poverty line. The latter line is difficult to draw. The boundaries of this group are hard to define. But it is clearly important to determine the size and the composition of this class, for within it are found the persons who have the strongest claim to pensions, if these are to be granted at all; namely, the deserving aged poor—those, who through no real fault of their own find themselves in want in old age. Is there a considerable percentage of such persons in the aged population of this state,—that is, persons who have been reasonably industrious, thrifty, and sober, and yet find themselves actually destitute in old age? This is another important question upon which the information gathered in the investigation will throw light.

The information that is sought concerning the class of non-dependent but necessitous aged relates to its composition as regards sex, nationality, occupation, income, physical condition; extent and forms of individual saving; amount of aid from relatives and others. In this connection, inquiry is also made into the extent to which pensions are already pro-

vided for the aged, through federal, state, municipal, or private agencies.

The year September 1, 1908, to September 1, 1909, was selected as the twelvemonth period to be covered by the investigation. September 1 was chosen as the earliest date on which a beginning could be made, after the organization of the Commission under its present chairman. In each division of the investigation individual schedules are used. In getting returns for the institutional population, the Commission has sought the co-operation of wardens of almshouses and superintendents of benevolent homes for the aged. With rare exceptions these officers have shown great willingness to aid the Commission in furthering the progress of the investigation. The enumeration of inmates of almshouses and homes on September 1, 1908, has been completed. The returns for admissions, deaths, discharges, and transfers during the year will, of course, not be completed until September 1, 1909. In obtaining information regarding the non-institutional poor, the Commission has applied to overseers of the poor in cities and towns of the state and to secretaries and agents of charitable societies. In cases in which the work of filling out schedules could not be undertaken by the latter, agents have been sent to obtain the returns.

In the study of the non-dependent aged poor the Commission has employed agents to canvass various industrial centres and rural communities throughout the Commonwealth. This part of the investigation cannot be made absolutely comprehensive, for that would require a house-to-house canvass of the entire state. The method adopted is that of sampling extensively this class of the aged population in different parts of the state. The returns relating to the several classes of the pensionable population, when tabulated and analyzed, should present a graphic statistical picture of the condition of the aged poor in Massachusetts.

The preliminary report, which the Commission submitted to the legislature in January, contains two appendices: the first giving an account of old age pension and insurance sys-

tems in foreign countries, including Germany, England, Denmark, Belgium, France, Italy, New Zealand, New South Wales, Victoria, Australia, Canada, and Austria; the second giving an analysis of pension systems of American railroad and industrial corporations. The latter is based on a study of thirty-two pension schemes, maintained by railroad companies, industrial, commercial, and banking establishments, concerning which the Commission obtained definite information. Regarding the nature, the provisions, and the objects of these private pension systems the report states:—

The general nature of the leading schemes is substantially the same. Provision is made for the voluntary or compulsory retirement of employees at a certain age, with weekly or monthly allowance. The amount of the allowance is determined by the length of service and the wages of the employee. It is usually calculated on a basis of a percentage of the average wages for each year of service. The expenses of the pension system are commonly borne by the employer, without contribution from the employee. Often the pension system is combined with provision for sickness and accident insurance, organized on a contributory basis.

The motives that have induced large corporate employers to provide retirement pensions are partly economic and partly humanitarian or philanthropic. Economic motives play the leading part. This thing has been done because it has been found to be good business policy. The economic gain from the pension system is twofold: it eliminates the waste and demoralization attendant upon the continued employment of old men who have outlived their usefulness, and it helps to promote industry, contentment, and loyalty on the part of the working force. The pension system aids in solving the difficult problem of stimulating the employees of a large corporation to the highest efficiency. . . .

The provisions of the leading pension schemes concerning which information has been obtained by the Commission may be analyzed briefly as follows:—

AGE OF RETIREMENT.

Most pensioning concerns fix one age for compulsory retirement and another for voluntary retirement, the latter including retirement at the request of the employee or at the discretion of the employer. Some companies permit also retirement by request or order at a still earlier age in case of invalidity or incapacity. The usual age of compulsory retirement is seventy years; of voluntary retirement, sixty years. In

several cases compulsory retirement is enforced at the age of sixty-five. In other cases voluntary retirement is not permitted before sixty-five, in one case not before seventy. One corporation fixes the age of voluntary retirement at sixty-two, another at fifty-five. In one pension scheme no age of retirement is specified, each case being dealt with by itself. In numerous instances, provisions have been made for retiring employees on account of incapacity at an age earlier than that fixed for regular retirement.

PERIOD OF SERVICE REQUIRED.

A certain minimum period of employment in the pensioning establishment is required in all cases as a condition of retirement on pension. The prescribed term varies from ten to thirty years. The latter minimum is required in only one case. The lower limits of twenty-five, twenty, fifteen, and ten years are selected in about the same number of schemes each.

AMOUNT OF PENSION GRANTED.

The amount of the pension is determined in various ways, on the general principle of allowing a certain percentage of the average wages for each year of employment. The usual arrangement is an allowance for each year of service equal to 1 per cent. of the average wages earned during the last ten years. For example, an employee who has served forty years, at an average wage of \$50 a month during the last ten years, would receive a monthly pension amounting to forty times 1 per cent. of that sum, or \$20. In one case the percentage of wages allowed is graduated from 1 to 2 per cent., according to the length of service. Another scheme provides for a monthly allowance equal to $1\frac{1}{2}$ per cent. for each year of service on the first hundred dollars, or any part thereof, of the highest average monthly pay of the employee during any year of his last ten consecutive years of service; and, in addition to this, an amount equal to one-half of 1 per cent. of any excess over \$100 of the average monthly pay for the ten-year period. Another company pays pensions proportioned to the amounts of the employees' previous contributions to the Compulsory Relief Fund for sickness and accident insurance. Still another corporation grants pensions at the rate of 25 per cent. of the average pay of the employee for the ten years preceding retirement, and also permits the voluntary retirement of employees between the ages of sixty and sixty-four, who have served the company twenty years, on pensions equal to 50 per cent. of the average pay for the preceding ten years, this higher rate to continue to the time the pensioner is sixty-five years of age, and the rate thereafter to be 25 per cent. Other methods of reckoning the amount of the pension are the

following: 1 per cent. of the total amount paid to the employee in wages during his entire period of service; 20 to 40 per cent. of the average annual wages according to length of employment; one-half of the average wages for the last five years of employment; one-fiftieth of the salary for each year of service up to a maximum limit of $\frac{1}{5}$ of the salary; a flat sum of \$10, \$15, or \$25 per month, according to the wages previously received. A maximum pension limit of \$100 per month is fixed in one scheme. Minimum limits of \$18 a month and lower are found in some cases.

PROVISION OF PENSION FUNDS.

The expenses of the pension system are in a great majority of cases borne entirely by the employer, no contributions by employees being required. The pensions are paid from a fund established by the company or from an annual appropriation, or by both methods. Some companies, however, require contributory payment by the employees. One system, for example, provides for a contribution by the employee to the amount of 2 per cent. of his wages and the payment of an equal amount by the company. Another fixes the employee's contribution at 3 per cent. per month, supplemented by an equal amount from the company. . . .

It is impossible to state the number of employees provided for under the pension systems, or the amount of expenditure for pensions. Returns gathered by the Massachusetts Bureau of Statistics of Labor in 1906, from fourteen railway companies operating pension systems, show that the aggregate expenditures from their pension funds had amounted to \$3,999,886.07. . . . The industrial corporations that have established pension systems are, in the majority of cases, employers of labor upon a very large scale. Indeed, the establishment of insurance and pension systems seems to be one of the usual features of the policy of the large corporations. The number of industrial workers who are now provided for by these pension plans must represent a very considerable proportion of the entire working class.

As these pension plans have been in operation only a few years, it is, of course, too early to draw conclusions regarding the degree of success attained. It is significant, however, that many corporations have increased their expenditure for pensions, while none, so far as can be learned, has abandoned a pension system once tried or reduced the expenditure for this purpose. What has been done thus far appears to represent a beginning in a movement that promises to do much toward solving, at least in part, the problem of industrial superannuation. It is

a fact of striking interest that, at a time when European governments are instituting systems of state insurance and pensions, maintained wholly or partly by general taxation, the American railroad and industrial corporations are attempting to solve this problem on their own initiative, through private systems supported by the revenues of the pensioning company.

The Commission intends to issue another special report, dealing with the question of pensions for municipal employees. This will embody the results of inquiries instituted by the Commission into the pension systems of all the larger cities in the United States. The problem of pensions confronting the municipality is essentially the same as that with which the large corporations have had to deal. The same reasons that have induced the latter to make special provision for the retirement of aged workers hold good in the case of the municipality. To continue men in the municipal service after they have outlived their usefulness in the positions that they hold means waste of the taxpayers' money and demoralization of the working force. On the other hand, to discharge outright aged workers who have been in the employ of the city for a long period of years is manifestly a harsh course, which the city as an employer of labor cannot afford to sanction by its example. The waste of the present practice of retaining aged employees in the service at regular wages is shown by certain returns prepared by heads of Boston departments, at the request of Mayor George A. Hibbard. The returns show that the total number of employees over sixty-five years of age in various departments is 491. The amount of compensation paid to them is \$419,888.45. The number over sixty-five reported as inefficient is 296, and the compensation paid to this group is \$200,194.35. Twenty-five per cent. of these employees have been in the service of the city over thirty years, only 5 per cent. less than five years. The percentage of inefficient employees over sixty-five years of age in some of the departments is strikingly large. In the Cleaning and Watering Division of the Street Department, for example, thirty-five men are employed, of whom all are reported inefficient. In

the Cemetery Department sixteen are employed, of whom all are reported inefficient. The Commission is obtaining similar returns relating to aged municipal employees from other cities in the country. This question of pensions for municipal employees is regarded by the Commission as the most urgent phase of the pension problem. Besides issuing a special report on the subject, the Commission will give it further extended consideration in its final report.

THE RELATION OF STATISTICS TO ECONOMICS AND SOCIOLOGY.*

BY S. N. D. NORTH.

The unavoidable absence of the distinguished President of the American Statistical Association imposes upon me the completion of a duty he has already in large part discharged. At the last annual meeting President Wright delivered the first presidential address to which the American Statistical Association has ever listened. His address was a review of the history and work of the Association,—a history that reaches back to 1839, a period of seventy years, thus making it one of the oldest of the scientific societies in the United States, and very much the oldest of the organizations now in simultaneous session in Atlantic City.

At that meeting there was an organized movement to bring this old and honorable organization out of the rut of mere existence and into the strenuous activities of to-day. The American Statistical Association has lapsed at times into a condition semi-moribund, taking little cognizance of the rapid advance in statistical science, and contributing in desultory and perfunctory fashion towards its development. It must, however, be credited with establishing a fine statistical library and a system of exchanges with foreign statistical offices and organizations. It has also established and maintained an official publication, and its quarterly publications have been the only organs through which our students of statistical problems have been able to reach a sympathetic audience. The publications have been among the most valuable periodical contributions to statistical science, taking rank with the *Journal of the Royal Statistical Society* of Great Britain and the publications of the

* Presidential address delivered at a joint meeting of the American Statistical Association and the American Sociological Society at Atlantic City, December 28, 1908.

International Statistical Institute. The publications can be made still more useful by a wider and better organized editorial co-operation among the members.

With all this to its credit, the Association has furnished little direct stimulus to statistical work, has suggested no new methods of procedure, and has not been a rallying point for young men and women who realize the possibilities and the opportunities of this field of study.

At the present moment the question which chiefly interests the Association is, What can be done—what ought to be done—to make the American Statistical Association a vital, predominating force in determining the directions in which statistical science shall advance in the United States and the agencies through which that advance shall be encouraged? It is a question we are not to dispose of to-night or to-morrow. We are to take it home with us, and we are to bring back our answers from year to year, at the future meetings of the Association.

We are already prepared to make a preliminary answer. With a large membership roll, in which the whole country is represented, the American Statistical Association has in reality been a local society, with its habitat in Boston. The interest in its meetings has thus been largely limited to that environment. An attempt to extend its influence by the establishment of a branch organization in Washington, in 1896, met with failure, chiefly because of the lack of stimulus from direct contact with the responsible officers of the Association.

Guided by this experience, we have now made a departure from which we hope to trace a new vitality and usefulness. We have sought affiliation with the several organizations with whose fields of study our own is in intimate touch. The membership roll of our association is largely made up of the men who sustain these other organizations. The purposes of all the organizations appeal equally to the same groups of students and thinkers.

The several sciences to which each is devoted are cognate branches of the same general science, which, in the broadest

terms, has been called the *Science of Life*. So intimately related are they that no one can draw a hard-and-fast line to indicate where the field of one ends and that of another begins. At every point they run into each other, and contribute to each other. The pioneer organization, the American Social Science Association, covers every field of research now outlined in the constitutions of these four organizations. The constitution of the American Economic Association especially includes all fields of statistics. It declares the purpose of that organization to be "the encouragement of economic research, especially the historical and statistical study of the actual conditions of industrial life." It has thus always recognized that statistics is at the root of economic science. In announcing its advent, the American Sociological Society declared that "it heralds the faith that all the social sciences are unscientific in the degree in which they attempt to hold themselves separate from each other, and to constitute closed systems of abstractions."

The separate existence of the present bodies is an illustration of the tendency of the times toward closer specialization in every line of human thought. By narrowing the field, more effective work results; but the bond of sympathy, the community of interest, remain unimpaired.

Since the final settlement of the questions growing out of the Civil War, the character of American political thought and activity has undergone a remarkable change. The old slogans have become meaningless. Our politics has to face the economic and sociological problems of a remarkable era. Congress must now deal with the practical questions which our extraordinary industrial development has created. The relations of labor and capital, the currency and banking, immigration, the regulation of railroads and their traffic, of corporations and their methods,—these are types of the questions which now dominate, both in Congress and the legislatures; and their insistent prominence gives to the work of all scientific organizations an increasing significance and a growing potency. Old age pensions, factory legislation, employers' liability, humanitarianism, in many forms and by means of many reforms,—

these have taken the place of the old-time theories of individual and industrial freedom, not only here but everywhere.

The conspicuous and significant feature of this economic age is the recognition of the fundamental postulate that the days of *laissez-faire* have gone by; that the future function of the state is the regulation of industrial and social conditions; that its responsibilities begin at the point where they were formerly held to stop.

This change has brought about a new demand for all the light that the statistical method can impart. I believe it was recognition of this fact which finally compelled Congress to establish the permanent Census Office. Since the Federal Constitution made perpetual provision for the decennial enumeration of the population of the United States, no more important step has been taken anywhere for the promotion of statistical science, and for the determination of public questions by the aid of the cold, impartial, impersonal, soulless, remorseless facts which the statistical method alone permits.

This situation suggests the theme of the interdependence and co-operative relationship of all the social sciences in their service to the future development of our country. Whatever phase of this development is interesting in connection with one should be interesting in connection with all. This community of interest is the most signal fact in to-day's situation, so far as concerns the future work of these organizations, and the service each can render in the work of the other.

It is necessary, to this end, that there shall be full and cordial recognition of the importance of the field and the distinctness of the function of each of the branches of social science. In this respect neither branch has any great advantage over the others. So far as the vital work of the future is concerned, each is in its infancy, and each still occupies the position of an inexact science, or, to state it in more complimentary terms, of a progressive science.

Speaking for the statisticians, I recall the old dispute as to whether there is any such science,—as to whether statistics

is anything more than an instrument which other sciences utilize to determine their premises, as in the case of the science of microscopy. It will in time become clear that the questions of statistical method, of interpretation, and of scope become so important, and the effects of their right determination so far-reaching, as to constitute a science in itself, calling for the best thought of the best brains for their right determination. Claiming that there is a science of statistics, it is still in the formative period, and is still groping in experimental fields. It is not possible to apply statistical measurement to economic facts and tendencies with any certainty, even in the most limited fields, to periods prior to the nineteenth century. For the purposes of the economists of the historical school, statistics are therefore of only incidental value.

Much that is put forth as definitely determined by statistics is a jumble of unrelated, uncorrelated, undigested personal opinions. But it is likewise true that not even the best statisticians yet fully comprehend the ultimate significance of their work, as a guiding thread to lead us in and out of the labyrinthian mazes of social progress. The statistical method, when scientifically applied, frees all investigation from the subjectivity of personal opinion and individual observation. It substitutes organized and demonstrated data for prejudice, dogma, and dictum. It marshals facts, expressed in exact numerical terms, with which to demolish the hosts of theory. It cuts athwart legend, tradition, superstition, and theology. It substitutes enumeration for imagination. Thus it brushes aside, neutralizes, obliterates, in the clear lime-light of ascertained data, fortified by mathematical demonstration, a vast mass of *débris*—intellectual, moral, and spiritual—in which the human race has been entangled for ages. It makes for exact knowledge, for straight thinking, and, so far as possible, for prevision.

To the economist and sociologist concerned with present-day problems and in search of a sure foundation upon which to base his conclusions, the statistical method offers an indispensable guide. In advancing this proposition, I frankly

admit that the statistical science is still far from a position in which it can claim to be a safe and sure guide. It is still an inexact science, has still to learn its own field, its possibilities, and its limitations. Of all fallacies, the most dangerous, because not only the most plausible but the most common, is the statistical fallacy. In this respect it claims to be in exactly the same situation as are the sciences of sociology and economics.

The attitude of the sociologists is equally frank. In their "profession of faith," accompanying the proceedings of the first meeting of their society in 1905, they recognize that "not many representatives of the older forms of social science are ready to admit that there is a function for sociology." They proceed to demonstrate that the history of the science and the steps in its establishment do not differ essentially from those of other sciences.

The truth of the proposition is demonstrated out of the mouths of the political economists. Said Professor Taussig, in his presidential address in 1905: "The whole structure of economic theory is undergoing revision. Many of the doctrines of Adam Smith and Ricardo have no more than an historic interest. It still remains to be seen just what the outcome will be in the reconstruction of economic teaching as a whole." "The science is still almost in its infancy," says Alfred Marshall. "The economic science of the present day," says President Hadley, "is very different in its methods of analysis and powers of explanation from those which form the basis of John Stuart Mill's 'Principles of Political Economy.'"

In a word, there is no science of economics to-day, and there never yet has been such a science, in the literal meaning of that word, because there is "no impregnable position where alone reign truths and proved laws." There has been and is an earnest and enormous effort to establish the rudimentary principles of such a science; and some great truths have been formulated and universally accepted as the basis of the science, but the fundamental truths still in dispute or under discussion exceed in number and importance those that are definitely

determined. In respect to so-called "economic truths," we are still confronted by the eternal question of Pontius Pilate,—
 "What is truth?"

From the days of Adam Smith economists have divided themselves off into contending schools, and have devoted the larger portion of their activities to proving each other in the wrong. The libraries of controversial economics, in which one school has annihilated another and been annihilated in turn, fill the dreariest, if not the most worthless, alcoves in our libraries. There is gentle sarcasm in Marshall's remark that "the early economists worked mostly at haphazard."

Profound as is our respect for Malthus, we are compelled to admit that his greatest work was founded upon a statistical fallacy. How much unnecessary anxiety would have been saved and the writing of how many unnecessary books avoided if statistics had succeeded in establishing, in Malthus's day, and for his especial benefit, the fact that the world's population does not increase in geometrical ratio!

The evolution is progressing, with equal definiteness and rapidity, in statistics, in economics, and in sociology. The proposition I advance is that the future development of economics and of social science depends upon their successful utilization of statistics and the statistical method more largely than upon any other consideration. Wherever sociology or economics can definitely plant its conclusions upon the demonstrated results of the statistical method, it stands upon solid ground, and reaches conclusions which stand the test of time.

Various schools have contributed their share toward such evolution, but the statistical method has contributed more than all the others to the formulation and the verification of the accepted principles of political economy. The science has been a growth, because it is so largely a study of development, under the rapidly changing conditions of modern economic life, and thus becomes, in large degree, dependent upon a measurement of the degree and the direction of that development.

Neither the character of a development, nor the measurement

of it, can be safely and surely determined by any other method than the statistical. Outside that method is the wide, uncertain, and dangerous field of empiricism.

If sociology and economics are to advance to the rank of exact sciences, they must do so chiefly through the aid of the auxiliary science of statistics. Their growing dependence upon the statistical method, and the increasing indebtedness of both to that method, is recognized by all modern economic writers. I quote from Alfred Marshall: "Arguments which can be reduced to statistical forms, though still in a backward condition, are making more sure and more rapid advances than any others towards obtaining the general acceptance of all who have studied the subjects to which they refer. The rapid growth of collective interests and the increasing tendency towards collective action in economic affairs, make it every day more important that we should know what quantitative measures of public interests are most needed and what statistics are required for them, and that we should set ourselves to obtain these statistics."

In other words, there has been established, through the statistical method, a great fundamental truth, upon which both economics and sociology rest, and from which they advance to the establishment of other truths. It is the demonstrated law of society that the average or typical conduct of masses of men, with allowance for many individual variations, operates, under given conditions, with a remarkable degree of regularity. It is the function of economics and sociology to note these regularities, to explain them, to differentiate them, and to educate the world to such modifications in regularity of action, under given conditions, as will promote the material and social well-being of mankind.

Thus population becomes the most important fact in sociology and economics, and the study of population is the starting point of both. In the long tables which present population in all its aspects and relations are deciphered the laws which govern mankind. With each recurring decennial enumeration of one-half of the people of the globe, the postulates based upon the last

prior census must be modified to fit the perceptible variations which appear.

Note in this connection how profoundly the nation has been impressed by the revelations of the recent census of marriage and divorce, and how the agitation for uniform divorce laws has been intensified. Note also the lessons that are drawn and the new problems that present themselves as the result of the census demonstration of the rapidly decreasing fecundity of the Anglo-Saxon branch of our people.

If the foregoing proposition is conceded, then a second proposition becomes its necessary corollary: if the claim of these sciences to be exact sciences is to be made good, it follows that the economist or the sociologist must also be a statistician if he is to correctly interpret the phenomena with which he deals and rightly formulate the principles which govern them.

I may illustrate by citing the case of General Francis A. Walker, from 1883 until his death, the president of the American Statistical Association, the first president of the American Economic Association, and the most distinguished member that either organization has numbered in its ranks.

Although I was fortunate enough to be associated with General Walker in the Census of 1880, it was not until I came to study his work in connection with my own present duties that I fully realized the grounds upon which it may be confidently claimed that he was the greatest all-round statistician the world has yet produced. Beyond any question he was the world's greatest census taker. It is true that no confrère in that work ever had an opportunity equal to that which fell to General Walker in planning and interpreting the Ninth and Tenth Censuses of the United States. But he crowned his opportunity by the very best results. In these two censuses he laid out the broad lines of inquiry which all future censuses must follow in all countries, and which before his day had only been partially and imperfectly outlined. All that has been possible since has been to follow in the straight pathway he marked out, to improve the methods he devised, and to ex-

tend the details covered by the tabulation. His model has become the world model; and his particular achievement—the centennial census of 1880, planned and executed on the broadest lines of a complete national Domesday Book—must remain the most marvellous single achievement of a statistician.

It was, however, in statistical interpretation that General Walker chiefly excelled. In each and every field of statistical inquiry his was the master mind. Whether it was the analysis of the statistics of population, or of agriculture, or of manufactures, or of mortality, or of the wide group of what we call the social statistics, he directed the text work, wherever his own hand did not actually indite it. Thus he differed from most statisticians in not confining his studies to a single field of statistical inquiry. He was *facile princeps* in every field.

This is the real explanation of the fact that General Walker was able to write the most effective American treatise on Political Economy. Somewhere he has written that “the distinction should always be made between the economic statistician, who finds the facts, and the economist, who puts the facts into their place in the industrial system.” That distinction did not exist in the case of General Walker, for he was both. And, because he was both an economist and an economic statistician, he became first among our students in both sciences. His achievement demonstrates the contention that, to master the science of political economy, one must also master the science of economic statistics.

The study of man in his social relations has never been more effectively made than in Walker’s writings on political economy. He has demonstrated that political economy and sociology run into each other at multitudinous points and in unavoidable ways. I only allude to this question again for the purpose of illustrating the fundamental proposition that, if there be here two sciences, there is also a third science,—the science of statistics,—upon which these two other sciences are equally dependent, without the aid of which neither can make the progress which must still be made, and upon the results of which both are dependent for their practical utility. The statis-

tician therefore asserts his claim to a rightful presence in the synagogue, with the economist and the sociologist, on equal terms and with equal rights and authority.

Insisting upon that claim, he presents his petition to his co-workers in these scientific fields. He craves and demands sympathetic co-operation and assistance. If it be true that the future of both sciences depends upon the statistical method, then it must also be true that the statistical method has not yet received that critical study from economists and sociologists which it ought to have and of which it is in need. This fact has come to be generally recognized. I believe it was General Walker who first introduced the systematic study of statistics as a necessary feature of the course in political economy, when he became President of the Massachusetts Institute of Technology in 1884. Since that date the teaching of statistics has become a regular adjunct of the course in political economy in our best universities. Each year additional institutions are following this example.

The rapid extension of this branch of instruction in the economic courses of our universities is, it seems to me, the effective demonstration of the propositions I have advanced, and of the general recognition of their soundness by our best American educators. The time is at hand when a statistical laboratory will be recognized as an indispensable part of every course of economics and sociology.

Most of you are familiar with the fact that Professor Walter F. Willcox, of Cornell University, accepted a relationship to the Twelfth Federal Census which brought that work into the closest possible touch with the university courses in political economy. I cannot commend in language strong enough the services he rendered in that connection, in the work of co-ordinating the census results with the requirements of economic science. His great work entitled "Supplementary Analysis" is the most suggestive and valuable contribution to statistical science which has yet appeared in any country. It has blazed the way to new uses of census material, the possibilities of which it does not exhaust but merely hints at.

The most crying educational need of the day is trained statisticians. It is indeed most extraordinary that we should have come to recognize so unreservedly the vital importance of statistics in the study of mankind, and should have done so little to train men how to handle this delicate but complicated instrument. State and municipal statistical offices throughout the Union are placed in charge of men who have had no training whatever in statistical compilation and analysis, and who do not recognize in that fact any restraint upon their activities. The valid excuse exists that properly trained men are not to be found. My experience teaches me not only the need for trained statisticians, but the growing demand for them; the broadening recognition of the fact that it is a need which the amateur cannot fill. We have now library schools which can supply all the demands for trained librarians which even the Carnegie libraries have created! But this vastly more difficult science, upon which such vastly more important matters hang, must take raw men and women, and leave them to train themselves!

This leads to the practical proposition with which I shall close. Congress, as I have just said, has recently established a permanent Census Office. For the first time since the organization of the Federal Government the opportunity has arisen for the orderly and scientific development of official statistical work along the lines that must be followed if it be true that the future history of the United States depends, in large measure, upon postulates established by the statistical method. If this be true, it is not possible to exaggerate the necessity that the Census Office shall go right in the work it is set to do, and in the increasing volume of work that is bound to come to the office as time passes.

The permanent office is still in the nature of an experiment. It has yet to justify itself. It has done some things already of recognized value. It has started a distinctly new movement in American statistical work,—that for the standardization of official statistics. I have no time here to recount what has been done in this direction, in the vital statistics of the states

and cities, in the financial statistics of the municipalities, and in the great field of industrial statistics. The Census Office realizes its opportunities, and it also understands its shortcomings. It needs your aid.

The development of the statistical work of the Federal Government must go forward, along lines approved by the organized bodies of the economists and the sociologists of the United States. The Census can be of immense service to them. They must realize that they can be of immense service to the Census, thereby promoting the orderly development of the co-ordinated sciences whose sane teachings are to determine what shall be the directions of our future civilization. Above all, help on this work by devoting more attention to the study of statistics in your colleges and your universities. Help the Federal Government to make its statistical work all that it ought to be, as an aid and a guide in the future development of the nation.

REVIEWS.

THE FIRST ANNUAL REPORT OF THE COMMISSIONER OF HEALTH OF PENNSYLVANIA.

Pennsylvania has long been one of the most backward of the greater States in matters sanitary. By a law passed in 1905 its department of health was thoroughly reorganized; and under the able leadership of Dr. Samuel G. Dixon there has been brought about a revolution which promises to place the State in a very different position in the future. The first annual report of the new board, covering the period from June 6, 1905, to Dec. 31, 1906, is of unusual interest, since it exhibits the application of the latest and most efficient methods of study to unusually primitive sanitary conditions.

Dr. W. T. Batt, State Registrar, in the section of the report dealing with Vital Statistics, points out that this "represents the first successful attempt on the part of Pennsylvania to collect, collaborate, and publish the vital statistics of the entire state," and "follows fifty-five years of fruitless efforts to accomplish this result." An act for the registration of births, marriages, and deaths, was passed in 1851, but it was so loosely drawn that reporting by physicians and clergymen could not be, and was not, enforced. A State Board of Health and Vital Statistics was created in 1885, but the registration law was not strengthened, and remained practically a dead letter. In 1897 the governor, in urging the need for proper registration, said, "Pennsylvania is the only one of the North Atlantic States without such a system, and she is behind almost every other State in the Union in this respect." The present law was enacted May 1, 1905, and went into operation Jan. 1, 1906. It requires a permit for burial, to be granted only after the filing of a proper death certificate; and provides for local registrars, appointed by the State Commissioner of Health. In the first year in which this law went into force, the State was admitted into the registration area of the United States Census Bureau.

The new report shows Pennsylvania to be an urban State: 20.8 per cent. of the total population in cities over 500,000; 30 per cent. in cities over 100,000; 57.2 per cent. in municipalities over 2,500. It is still largely a native American State; 84.4 per cent. of the population is native born. An interesting comparative age table shows that Pennsylvania has less than the average (United States) population under twenty years, and more, from twenty-five to seventy.

In looking over the causes of death, the most striking things are the high rank of violence (third), cholera infantum (fourth), and typhoid fever (tenth). These are clearly strategic points in the campaign which the new board is to wage. The death-rate from typhoid fever for the State is given the astonishing value of 56.5 per 100,000. Such rates are not uncommon in particular cities, but for a whole State the figure is appalling. The seasonal distribution of the disease shows the characteristic winter and spring peaks of water-born typhoid, and it is fairly certain that the death-rate is conditioned mainly by the prevalence of such grossly polluted water supplies as those of Philadelphia and Allegheny and Pittsburg and Scranton, to name the four largest cities in the State. It might have been well to include in the report the typhoid death-rates for individual municipalities in order that the gross offenders might be clearly revealed. It is certain that, of the 3,917 annual deaths from typhoid fever in the State, at least two-thirds are easily preventable.

The high mortality from cholera infantum (10,187 deaths from diarrhoea and enteritis under five years) is no doubt also partly due to polluted water. Milk, however, must also play an important role. The ratio of deaths under one year to 1,000 births is 167, which harmonizes pretty well with the high rank taken by cholera infantum as a cause of death (147 per 100,000 total population). The corresponding rate in Massachusetts is about 83: it can be safely assumed that 4,000 deaths a year from this cause in Pennsylvania are preventable.

The deaths from violence in the State amounted to 10,180, or 146.9 per 100,000. Railroad accidents accounted for 2,387 of these deaths, and injuries in mines for 983. It is difficult to compare industrial accidents in different communities, but we know in a general way that railroading is five times as fatal and mining three times as fatal in the United States as it is in England.

The new Board of Health has already begun an energetic and efficient campaign for pure water supplies and for the protection of the rivers of the State. It has ample powers to deal with the problem of milk supplies, and even to cope with the deep-rooted evils which permit and encourage the slaughter of thousands, in the mines, and on the railroads, of the United States. The success which it attains will be written with unusual clearness, and read with unusual interest, in the succeeding volumes of the annual report.

C.-E. A. WINSLOW.

AMERICAN STATISTICAL ASSOCIATION.

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THE LIFE AND WORK* OF CARROLL DAVIDSON WRIGHT,

FIFTH PRESIDENT OF THE AMERICAN STATISTICAL ASSOCIATION.

BY S. N. D. NORTH.

We have gathered to pay tribute to the memory and to commemorate the services of Carroll Davidson Wright, the President of the American Statistical Association. In an active existence of seventy-one years this venerable and useful Association has had but five presidents, each of whom was re-elected until his death. Hon. Richard Fletcher, the first, served six years; Dr. George C. Shattuck, the second, five years; Dr. Edward Javis, the third, thirty years; General Francis A. Walker, the fourth, thirteen years; and Colonel Wright, the fifth President, twelve years.

It is a remarkable roll of illustrious men, each of whom was regarded in his day as the ablest statistician in the United States.

Carroll Davidson Wright was the legitimate legatee of Francis A. Walker, in the presidency of the Association.

At the moment of his untimely death in 1896, General Walker was recognized not only as the ablest statistician this country had yet produced, but the greatest all-round master of the science of statistics. It is my function to demonstrate that President Wright, while he differed from General Walker in many of his methods, while he did not carry the science of

* Address delivered at a special meeting of the American Statistical Association, Boston, May 14, 1909.

statistics to the close analytical results attained by General Walker, nevertheless belonged by right in this kingly company; that he enlarged the scope of statistical investigation in new and difficult fields; and that in certain important particulars he was the peer, if not the superior, of any of his predecessors.

This is not the occasion for a biography of President Wright, but I must briefly outline certain features of his career which are almost unique, extremely significant, and strikingly illustrative of his character and motives.

Descended from typical New England ancestors, of mingled English and Scotch blood, President Wright was born in New Hampshire in 1840, the son of a devout country preacher of the Universalist denomination. He was taught from boyhood that he must be the architect of his own fortunes. Denied the advantages of college training, he alternately studied in the rural academies and taught school to pay his way. Leaving home at sixteen, at eighteen he was studying law, first at Dedham and afterwards at Boston.

When he was almost ready to take up his chosen profession, he was caught and overwhelmed by the thought that his country needed, instantly, the best service of its every loyal son. At the age of twenty-two he enlisted as a private soldier in Company C of the Fourteenth New Hampshire Volunteers. He was commissioned second lieutenant of his company before his regiment was ordered to the front.

He revealed at once certain qualifications which marked him for special and delicate duties. He was in turn commissary, aide-de-camp, assistant adjutant-general, under different commanding officers; and at the close of the war he returned to his home the colonel in command of the regiment in which he had enlisted as a private.

President Wright resumed the study of law, and was admitted to practice. He made rapid progress in his profession, and as quickly earned the esteem and confidence of his friends and neighbors. In 1871, and again in 1872, he was elected to represent the Sixth Middlesex District in the Massachusetts Senate.

His services here were of notable value, as chairman of the Committees on Insurance and on Military Affairs. His career as lawyer and legislator was permanently ended in 1873, when he accepted the appointment as Commissioner of the newly created Massachusetts Bureau of Statistics of Labor.

It was the turning-point in his career. He was upon the threshold of a successful legal practice. He was assured of rapid political advancement in a state which ties to men of his type. It can hardly be said that he dropped his profession with the deliberate intention of never returning to it: he could not foresee what was to happen; but it is certain that he was tempted into the new field by a vague realization of the possibilities it offered for a great governmental innovation. It appealed to his sympathies and aspirations as offering a unique opportunity to do the world a peculiar service. Once his hand was put to the plough, he neither faltered nor hesitated nor regretted. He had found a mission in life. He found himself fitted into just that niche for which his mind and temperament were best adapted. It was given to him to fill this niche for the forty best years of his life; to expand it and enlarge it, as he himself developed and grew; to become recognized throughout the civilized world not only as a pioneer, but as the greatest exponent of a new gospel of industrial ethics.

It thus fell to Colonel Wright to blaze the pathway in an entirely novel field of governmental investigation in the United States,—a field into which many men, at the time, thought it unnecessary, chimerical, and even dangerous for the government to enter at all.

The Massachusetts Bureau of Labor Statistics, established in 1869, was the first bureau of its kind in this country—perhaps the first in the world. Its first chief, General Henry K. Oliver, a good, earnest, honest man, did not fully grasp the significance of the movement he had been chosen to lead. The three years of his administration worked out nothing definite, tangible, or valuable. The whole undertaking was still in the air,—in truth, according to good authority, it was well on the

road to extinction as a useless appendage to the body politic.*

Governor Washburn sent for Colonel Wright, then about thirty years of age and just completing his service in the Senate. He said to him: "I have watched your work on some measures in the Senate. I think I know you, and now I want you to take charge of this Bureau of Labor, and make it or bust it!" Governor Washburn read the young man right: he must have foreseen something of what was to come from his choice, but he could not have foreseen all nor the greater part.

The Massachusetts Bureau of Labor Statistics was established as a half-hearted, and perhaps not altogether sincere experiment, in recognition of the fact that the relations of capital and labor constitute a practical problem in self-government which the state must face and deal with, in some fashion, sooner or later. It was then regarded as a purely state problem—not an interstate or national problem—which each state must separately handle in its own way. That Massachusetts was the first to recognize its existence is to her everlasting credit. Her action was a natural result of industrial supremacy combined with high civic standards—the same combination of causes which has kept the Bay State ever since in the vanguard of the American commonwealths in legislation to protect and promote the welfare of the wage-earning citizen.

It is difficult to realize, at this distance of time, the discouraging conditions which surrounded the earlier work of the Massachusetts Bureau. Its advent had been made amidst apprehension, criticism, and open or covert hostility on the part of the employing interests. Its failure and abandonment, as I have said, were imminent. The task of steering the ship into a harbor of useful vitality confronted Mr. Wright at the start. He took his bearings by the sun of common sense and constructive conservatism. From the start he resolutely refused, in the face of much pressure and much hostile criticism, to convert this new state mechanism into an engine of factious agitation and partisan propaganda. He set out to make reports that should search for and find the truth, not in the in-

*. See Quarterly Publications, American Statistical Association, March, 1908, p. 15.

terests of one class of the community against those of another, but in the interest of all classes alike. He held the scales impartially.

When President Wright delivered the eulogy before this Association on the character and services of his predecessor, Francis A. Walker, he quoted at length a letter of advice and counsel he solicited and received from him when he became chief of the Massachusetts Bureau. "Your office has only to prove itself superior alike to partisan dictation and to the seductions of theory," wrote General Walker to Colonel Wright, "to command the cordial support of the body of the people. If any mistake is more likely than others to be committed in such a critical position, it is to undertake to recognize both parties as parties, and to award so much in due turn to each. . . . I have strong hopes that you will so distinctly and decisively disconnect the Massachusetts Bureau from politics—from dependence on organizations, whether of workingmen or employers, and from the support of economic theories, individual views, or class interests—as to command the moral support of the whole body of citizens and receive the co-operation of men of all occupations and degrees."

"In this characteristic reply," commented President Wright, "General Walker laid down the enduring principles of official statistics,—whoever adheres to them will meet with success; whoever neglects them commits a crime." In the thousands of pages of official reports and investigations which have since appeared over President Wright's name, there is not an instance of departure from the straight and narrow pathway thus laid down and thus unreservedly accepted. They contain conclusions which were frequently controverted,—from some of which I have myself dissented,—but there is no instance of a partisan bias or a prejudiced perversion of the truth.

Thus in time President Wright conquered opposition, disarmed criticism, and made his bureau the agency for gathering together a wealth of data relating to the conditions surrounding industrialism in Massachusetts which has had enormous influence upon the development of the Commonwealth. In the

forty years that have elapsed, Massachusetts has held aloft the beacon light which, without flickering or wavering, has pointed the way for all the states of the Union.

It is impossible to exaggerate the influence which President Wright's sagacious foresight has exerted in this field. Thirty-four states have followed the example of Massachusetts in establishing labor bureaus. Not always were they established for work along the lines he marked out; not always have they been free in their management from the propaganda he avoided. Sometimes they have been officered by politicians, sometimes by men without scientific training or experience, with no knowledge of the statistical method and its limitations, and with selfish ulterior motives and ambitions but slightly veiled. The sum of their contributions to our statistical literature has been much greater in bulk than in value, and there are occasionally reports which are sadly out of joint with the economic facts.

But whatever of good there is in the reports of these thirty-four state bureaus, whatever of good there is to come from these bureaus in the future, is primarily due to the influence and the example of Colonel Wright. It is just to add that the pace and the precedent he set, at the very beginning of his work, have never yet been fully equalled in any one of these thirty-four states, after an interval of forty years.

President Wright recognized the dangers that threatened these state bureaus under the conditions I have named, and he conceived a plan to minimize the possibilities of evil and to increase their practical usefulness. He planned and organized a National Association of Labor Bureau Chiefs, which this year celebrates its twenty-fifth anniversary. He was elected its president in 1885, and re-elected until his retirement from office in 1905. He was rarely absent from its meetings. Here, by wise and good-humored advice and suggestion, and by leading his fellow-commissioners into the critical discussion of their own work, he impressed his personality, his methods, and his ideals upon the whole body. They felt, and were glad to feel, that they were sitting at the feet of their Gamaliel.

In 1884, near the close of President Arthur's administration, the National Bureau of Labor was established by Congress. The name of President Wright was naturally first in the mind of the President as the one man best qualified to organize this bureau, as the first Commissioner of Labor. But it seemed neither fair to him nor to Massachusetts that he should be asked to vacate his state office for a possible service of but two or three months in the national field, when, in accordance with the old-fashioned methods, the commissionership must be tendered to some aspirant bearing the badge of a political party flushed with its first national victory since the Civil War. The perplexity of the President became known to Mr. Cleveland, who sent word that, if Colonel Wright was appointed, he would continue him in the office, as he did. I recall this authenticated incident because it demonstrates the assured position of master in this special field which Colonel Wright had already reached, and, what is quite as important, Grover Cleveland's recognition of the duty of the President to the public. Eight Republican and two Democratic governors in Massachusetts, and four Republican Presidents, and one Democratic President serving two terms, retaining Colonel Wright continuously in the public service, against great pressure for a post towards which ambitious politicians cast covetous eyes. It is a record unique in our history.

Again, with the creation of the National Bureau, there was protest, apprehension, and indignation that the nation should venture to intrude itself into this sacred field of the *laissez-faire*,—to question the right of the business man to handle his hired help in his own way, guided solely by the law of supply and demand. Again, Colonel Wright disarmed criticism by his sane and conservative methods. The critics were not among the manufacturers alone; they included some of the more radical and aggressive of the labor leaders. They argued that the new bureau had been established at the behest and in the interest of labor, to fight its battles openly and constantly. President Wright did not so interpret its functions or his duty. He sought sedulously to avoid controversy, al-

though in the nature of things he lived constantly in its atmosphere. He once told me that it was an unbroken rule of his life never to reply to personal attacks upon himself or his work.

Avoiding the polemics of the labor question, President Wright directed the energies of the National Bureau into the investigation of the economic conditions surrounding labor and the study of methods for promoting the welfare and uplift of the working classes. The reports of the bureau during the twenty years of his administration are a mine of information on such subjects as the conditions of workingmen and working-women, the slums of the cities, co-operative production and distribution, building and loan associations, trade and industrial education, railroad labor, convict labor, industrial depressions, compulsory insurance, the unemployed, wages and hours of labor, the housing of the working people, regulation and restriction of output, together with the annual reports he organized on the costs of productions, strikes and lockouts, wholesale prices, divorce, and the cost of living.

He developed a bureau of economic research, devoted to the study of all movements for the improvement of the conditions of labor. He scrupulously avoided propaganda in the interest of the labor union crusade; and by this wise and conservative course he not only strengthened his bureau and enlarged its sphere and influence, but immensely advanced the material interests of labor, both organized and unorganized.

While his attitude towards the trade-union was always distinctly friendly and sympathetic, he deprecated the excesses that have sometimes distinguished its methods. He became a potent personal factor in the movement for the gradual elimination of the methods of savagery from the strike and the lock-out. His annual reports on the latter subjects were an impartial presentation of the statistical facts revealing the actual results of these trade warfares, accompanied by certain conclusions which his investigations justified. "As a rule, trades-unions oppose strikes," was one of these conclusions. "They are growing more and more conservative in their attitude towards these questions," was another. His influence among

union labor men was uniformly in the direction of moderation; and it steadily pushed forward the advance of organized labor to the position it is destined to occupy in this country. This I know from the words of labor men. President Wright gradually won the deep respect and the profound regard of their ablest and most useful leaders.

From the beginning of his study of this great human question, President Wright foresaw, as through a mental telescope, the position which organized labor was destined to hold in the great drama of industrial life. He had studied the labor question in all phases of its evolution, in all the ages that have gone before. He realized that it was interlocked with the whole future of civilization. He understood that it must pass through its several stages,—stages of injustice, of intrigue, of riot, even of bloodshed. But he foresaw the ultimate outcome, never faltering in his conviction that the time will come when the employer and the employee will settle their grievances face to face, man to man, with open books, each with careful regard for the rights of the other. His faith has carried us a long way towards the realization of that dream.

To his persistent advocacy may be attributed the wide recognition which the principle of collective bargaining, and incidentally of the sliding scale method of wage adjustment, has already secured. He taught employers that it is better "to deal with well-organized and administered trade-unions as the medium through which to adjust questions of wages and other conditions of employment, rather than subject themselves to the chaotic and unreliable results which follow when workmen act as individuals."

The direct moral influence of Colonel Wright's personality and work was much greater than organized labor itself yet realizes, and it is an influence destined to continue and increase.

It was quite as potent with the manufacturer. He compelled the respectful attention of the employers of labor throughout the country; he was a frequent and honored guest and speaker at their gatherings. He held and fearlessly enunciated a doctrine regarding their duty and their opportunity which

lifted the manufacturer above the category of the mere fabricator of goods and wares, the mere purveyor to physical wants, the mere seeker after dollars. I will illustrate this by a single quotation from his writings, which embodies the highest conception of the responsibility of the entrepreneur, a conception which not so many generations back would have been regarded as preposterous, but which to-day, while not always, perhaps not generally, accepted, is no longer openly disputed:—

“The weal or woe of the operative population depends largely upon the temper in which the employers carry the responsibility intrusted to them. I know of no trust more sacred than that given into the hands of the captains of industry, for they deal with human beings in close relations; not through the media of speech or exhortation, but of positive association, and by this they can make or mar. Granted that the material is often poor, the intellects often dull, then all the more sacred the trust and all the greater the responsibility. The rich and powerful manufacturer, with the adjuncts of education and good business training, holds in his hand something more than the means of subsistence for those he employs: he holds their moral well-being in his keeping, in so far as it is in his power to mould their morals. He is something more than a producer: he is an instrument of God for the upbuilding of the race.

“This may sound like sentiment: I am willing to call it sentiment; but I know it means the best material prosperity, and that every employer who has been guided by such sentiments has been rewarded twofold,—first, in witnessing the wonderful improvement of his people; and, second, in seeing his dividends increase and the wages of the operatives increase with his dividends. The factory system of the future will be run on this basis. The instances of such are multiplying now, and, whenever it occurs, the system outstrips the pulpit in the actual work of the gospel; that is, in the work of humanity. It needs no gift of prophecy to foretell the future of a system which has in it more possibilities for good for the masses who

must work for day wages than any scheme which has yet been devised by philanthropy alone." *

And so President Wright conducted the National Labor Bureau as he had conducted the State Labor Bureau. So it happened that he had the unique experience of being continued at the head of these two bureaus as long as he would stay there,—an experience the more remarkable and interesting because this particular bureau was a storm centre, always encompassed about by political dynamite. He had come to be known as the sane seeker after truth. He had compelled the complete confidence of his fellow-men.

This is the central and striking fact in his life,—the key to his character and his career. I shall therefore dwell upon it here, in the hope that we may fully understand it.

In the first place, Colonel Wright was a man of great tact. He was what is known as a good "mixer." He could fit himself to every environment. In personal intercourse he was cordiality, kindness, and good humor combined. I have rarely known a better story-teller. He had an anecdote to fit every emergency. He could relieve a taut situation by a flash of quaint or subtle humor that would force a laugh on the verge of a quarrel. He was pre-eminently a pacificator: his mission was to point the pathway to peace; and he had consummate art in finding it. But never at the sacrifice of his own convictions. He would never commit himself to a course he believed to be wrong; but he could see both sides of every question, and, when he was compelled to differ, he knew how to do it without arousing militant antagonism. He commanded respect for his opinions, but he thrust them down no man's throat. His absolute sincerity was never questioned, even though it was always yoked with urbanity.

Thus President Wright possessed all the qualifications for the most difficult duty which fell to him by reason of his office as National Commissioner of Labor,—the duty of acting as the official investigator of great labor disturbances and sometimes as arbitrator between the contending parties. He was the

* "The Factory System as an Element of Civilization," by Carroll D. Wright.

chairman of the commission appointed by President Cleveland to investigate the great Chicago strike of 1894. That strike in some of its aspects, and particularly in the questions of national authority involved, was the most dangerous and ominous labor strike which has taken place in this country. President Wright's report was absolutely colorless in its presentation of the facts, fearless in its analysis of their bearing upon each other, and uncompromising in its conclusions. It at once encountered a criticism most violent and vitriolic. In the case of almost any other man, the episode would necessarily have terminated his public career. With President Wright, as the atmosphere cleared, and passion cooled, it added much to the strength of his position.

In the great anthracite coal strike of 1902 Colonel Wright was, from the beginning to the end, the trusted adviser of President Roosevelt, and helped him to shape the masterly policy by which he dealt with the situation. While the trouble was still brewing and before the actual strike occurred, the President called upon Mr. Wright to ascertain and report to him the causes and conditions underlying and surrounding the controversy between the miners and the operators. Within a period of less than two weeks Mr. Wright had placed in the President's hands a report which condensed into twenty printed pages the whole horrible story of a controversy that had been brewing for years, and was complicated by innumerable technical intricacies and interwoven disputes as to the facts. The report is one of the most luminous and discriminating documents in official literature. It handled fearlessly, lucidly, and with absolute impartiality the several contentions of both parties. It contains this interesting basis for the diagnosis it presents: "The specific demands in a strike are the material elements on which the controversy is based. But the psychological elements must also be considered, to ascertain the true situation." In its analysis of the case, from these two points of view, the report is a masterpiece. It concluded with certain "suggestions that seem desirable and just." "Should they be adopted," said the Commissioner, "with some

modifications perhaps, they would lead to a more peaceful and satisfactory condition in the anthracite coal regions. They may not lead, even if adopted fully, to perfect peace, nor to the millennium; but I believe they will help to allay irritation and to reach the day when the anthracite coal region shall be governed systematically, and in accordance with greater justice and higher moral principles than now generally prevail on either side."

These suggestions were not accepted, either in whole or in part, by either party. The report was followed in time by that long, bitter, and dramatic strike which the President finally terminated by the appointment of the Arbitration Tribunal, to whose findings he compelled both parties to agree in advance to abide. Colonel Wright was the recorder of that tribunal, and its guiding spirit throughout its long, epoch-making proceedings.

Thus we realize how important a chapter President Wright's life constitutes in the history of the labor movement in America—"quorum pars magna fui." No other man, all things considered, has played so large a part in the remarkable modification of the legal, the political, the social, and the educational status of the workingman that marks the last half-century.

During all these years of official activity President Wright displayed an extraordinary literary industry and a versatility equally remarkable. One of his great tasks was the completion of the Eleventh Census after Superintendent Porter's resignation,—a task for which he was again selected by President Cleveland, because no other available man was so conspicuously fitted to wind up the work.

He had been thoroughly trained in the general principles governing the practical application of the statistical method in the development of his bureau work. He had inaugurated many new statistical presentations of the human problems in the most difficult field of statistics. There is no more troublesome problem, for instance, than the statistical study of wages and the proper differentiation between wages and earnings. We are to-day still very far from the satisfactory treatment

of this complex problem. President Wright frankly admitted that his handling of this and of some other statistical problems was crude and tentative. But he had one characteristic as a statistician by which his successors in this field must judge him, and out of which grew his chief service to the science of statistics. It may best be stated in his own language:—

“If the statistical investigator is really scientific in his methods of study, he cares not so much to be pleased by what the results may bring out as to feel assured that the showing is accurate; he is ready at all times to recast his opinions, to modify his reasoning, and even to turn his mind into new channels of thought, whenever the statistical results require that such changes shall be made; his face is always turned to the light.”*

With this intense devotion to the truth, at the sacrifice of all personal opinions, President Wright cherished profound contempt for the statisticians—so called, and, alas! too plentiful—who ingeniously and ingenuously twist and distort statistics to give color or credence to some preconceived conception or prejudice on the subject under statistical treatment. It is a simple matter, as President Wright often pointed out in his lectures, by some deft construction of statistical tables, unsuspected by all but the trained expert, to convey totally false impressions regarding the real facts under consideration. The statistical fallacy thus championed is the more dangerous, because of its plausibility, when apparently fortified by official figures, which are supposed never to lie, and yet can be made to lie atrociously. The statistical mountebank was the scorn and horror of Colonel Wright. It is the presence of this statistical mountebank everywhere—in the newspaper, on the rostrum, in official reports—which has hampered and limited the science of statistics, as the one effective instrument by which to measure the volume and the trend of the great forces always at work in the evolution of human society.

President Wright was an attractive personality on the lecture platform, and his services were always at the disposal of a good cause in any part of the country. His repertoire was full

* Outline of Practical Sociology.

to overflowing. He was most effective in interesting the public in the topics which occupied his own thoughts,—topics too commonly regarded as tedious. His way of presenting them appealed to the popular audience by its appeal to the human element. But he was always serious and always scholarly. He was for years a lecturer in the economics department of the Catholic University at Washington, and in the George Washington University; and he delivered many courses of lectures before the Lowell Institute and most of our universities and colleges.

He was a tireless contributor to magazine literature. His essays on social and industrial topics constantly appeared in our best periodicals. He was the author of two notable books, "The Industrial Evolution of the United States" and "An Outline of Practical Sociology," both of which have passed through many editions and have done great service as textbooks in our educational institutions. To convey a definite impression of his intellectual activity, I have attempted a bibliography of his writings—ephemeral, official, and otherwise—which I shall attach to this address.* It embraces no less than 350 titles.

I would not convey the impression that this formidable title list reflects the individuality of Colonel Wright alone. He would have been the first to disclaim such an inference. He possessed in marked degree the power to train co-operative thinkers and to direct their work in the channels of his own thought. His bureau at Washington has been a university for the education of experts in statistics, in sociology, in economics, and in industrial studies. From no other office has graduated so large a group of trained men who are making their mark to-day in the government service, in our educational institutions, and in social and civic organizations.

I must not omit allusion to the great work he planned and to the supervision of which he devoted the best energies of his later years, "The Economic History of the United States,"

* Owing to lack of space this bibliography will be published in the September number of these publications.—[Ed.]

financed by the Carnegie Institution at Washington, of whose trustees and executive committee he was an active member from its foundation. Surrounding himself with a corps of the first specialists in each field of economic research, some fifteen in number, he blocked out a work which, in scope, in thoroughness of research, and in significance of results, is without a prototype in the economic field, which will stand for all time as the standard study of the origins, the development, and the influence of the civic institutions of the nation which are profoundly modifying the civilization of the globe. He hoped to live to see its completion. It will become his monument.

But the magnitude of this task weighed upon him; and he had overestimated and overtaxed his strength for years. It can truly be said of him that he literally worked himself to death.

As he neared the completion of forty years of official service, under changed administrative conditions in Washington, which were naturally irksome after his long years as the head of an independent department, President Wright was approached by the late Senator George F. Hoar with the suggestion that he accept the presidency of the new Clark College in Worcester, recently endowed by the founder of Clark University, but occupying an independent relation to that institution. President Wright was deeply touched by the suggestion. It came at a most opportune time. Though he maintained his wonderful serenity undiminished, he felt tired after his long service, and he realized that his physical strength was waning. He was impressed that he, unblessed by college education, should be deemed most worthy to organize a new college, designed to teach the old institutions some new and better methods of education. He gratefully accepted the trust, and he put Clark College on its feet, bringing into its organization and methods certain new and practical ideas, destined to work something of a revolution in our American colleges. From the day that Clark College opened its doors, with President Wright as its head, it was a success; and it will continue to grow and to thrive because it will cling to his ideals.

I have thus hurriedly sketched this unique and inspiring career, and indicated some of its multiform activities and something of the character and personality, something of the spirit, the methods, and the ideals which marked it and made it a thing apart.

I have left for the last a reference to the real secret of the man whose memory we so profoundly revere. We must couple with this picture of the man a brief study of his philosophy of life, if we are to fully understand him.

At the foundation of this philosophy was the instinctive sense of justice. In working out a theory of life based upon the sense of justice, President Wright troubled himself very little with the abstractions of political economy. He is often spoken of as an economist: it is doubtful if the economists, profoundly as they respect him, will accord him a high place in their synagogue. He took little interest in the theories of capital, of exchange, of money and its value, of the production and distribution of wealth, of the dynamics of the science,—of any of the controverted topics which have filled so many dreary libraries and led to so many endless controversies among the economists since the attempt to formulate such a science first began. Throughout the great volume of his writings and reports these topics are avoided,—ignored. An entirely different point of view everywhere pervades and illumines them.

We may call it the ethical point of view. Birks has defined ethics as the science of ideal humanity; and that definition fits Mr. Wright's conception of the science it was his life-work to expound. He dealt with the nature and grounds of moral obligation and the rules which ought to determine conduct in accordance with this obligation. This is the spirit which always underlies his analysis of statistics and his interpretation of a given statement of facts.

"The real labor question," he wrote in "*Sociology*," "is the struggle of humanity for a higher standard"; and, again, "It is a conflict which cannot be avoided, and which has existed since the beginning of man. This conflict is the labor ques-

tion in the broadest sense,—not the minor problems of rates of wages and hours of labor.”

Thus he was a sociologist rather than an economist; and, as he interpreted the science of sociology, it is the science which studies for the betterment of society and the world.

In all his work, President Wright was guided and inspired by a temperamental characteristic which must be fully understood if we would know the man and properly interpret his works. It was common for his friends and students, in analyzing the spirit pervading his work, to speak of him as an optimist. No untoward concatenation of events seemed able to shake his serene confidence that all things are working out for the best in God's scheme for the universe. He possessed a radiant faith in humanity and in the orderly evolution of human society. It was not merely the spirit of hope, not merely the habit of looking at the bright side of things, or the blind acceptance of the useful proverb that it is always darkest just before the dawn: it was something deeper and more comprehensive than a mere temperamental characteristic. It had its root in the complete acceptance of the great fundamental law which governs this universe and all things in it,—the law of progressive evolution.

The statisticians have a habit of representing the meaning of figures by the graphic chart, commonly called the art of cartography. A symbolism frequently used is the curve. There is hardly any line of statistics that does not yield readily to this form of graphic presentation. The peculiarity about these curve lines, when applied to sociological statistics, is that, while they frequently show a tendency to drop, and the depression is often sharp and sudden and sometimes prolonged over a long period, yet, if the statistical range covers a period sufficiently long to justify final conclusions, it is found that the curve line, once it begins to recover its upward movement, lands at a point higher than that at which it rested when the tendency to drop began. In other words, while the progress of the world is often interrupted by the operation of temporary causes, nevertheless there is always progress. Despite set-backs

here and there, despite the fact that we can often see no sign, the upward tendency exists and persists, and the world is growing better all the time. That is the philosophy and the inspiration of President Wright's interpretation of statistics. That is the spirit he read into them, not arbitrarily, not temperamentally, but because he was big enough and broad enough and sane enough to know that that must be, in accordance with the immutable law which governs this universe. That is why his influence and his teachings were so healthy, so wholesome, so powerful for good. No man in this country has done more to teach the people how to read aright the lessons which all honest statistics teach them, when rightly understood and honestly interpreted.

He has taught the nation that every new collision between labor and capital, so far from sowing new dragons' teeth to fructify into new crops of dissension, tends to bring into clearer light the economic principles which must, in the end, determine the relations between these two great forces of industrial life, each as necessary to the other as the two poles of an electric battery. He has taught that every such conflict illumines anew the great ethical principle underlying the whole question,—that neither party to such a conflict has any rights which in the slightest degree interfere with the rights of others.

Looking still deeper into President's Wright's philosophy, we find its full and final explanation in the profoundly religious spirit of the man. It seems perfectly natural that he was frequently called upon to occupy the pulpit in the church to which he was devoted, for the delivery of a lay sermon. We can best show how the religious spirit moulded and guided his thought by quoting from the concluding words of his "Practical Sociology":—

"There is a new religion," he wrote,—“a religion of progress. . . . The study of life's problems convinces me that there is coming a revival of a religion which shall hold in its power the church, industry, commerce, and the whole social fabric. Any solution, all solutions, must embody within themselves

some phase of such a religion, and unless they do, they will have no force."

Here is revealed a reasoned and deep-rooted trust in the essential beneficence of the all-pervading divine purpose, which President Wright found writ large in the history of all ages and human society everywhere.

THE FEDERAL CENSUS OF OCCUPATIONS.*

BY WILLIAM C. HUNT.

In preparing to take the Thirteenth Census, the time for which is fast approaching, the Census Office will be confronted with no more important duty probably than to provide for the proper return and classification of occupations, so far as, in the nature of things, this may be possible.

The Federal census at its inception was comparatively simple in its requirements, and at the first six enumerations was mainly concerned with the distribution of the free and slave population according to sex and age, to which were added two or three other inquiries at some of the later enumerations. These inquiries concerning population were made in connection with the name of the head of the family only, and were supplemented, in 1810, 1820, and 1840, by attempts, mostly unsuccessful, to collect statistics of industry.

At the Seventh Census, in 1850, however, there was not only a very material extension of the census inquiries, but an important change in the method of enumeration, by which instead of the return in simple form of the number of each of the various classes of persons in each family, in connection with the name of the head of the family only, as in the preceding censuses, there was inaugurated the present system of individual enumeration, whereby a detailed return was required concerning each living inhabitant, each decedent, each farm, and each establishment of productive industry. These changes in scope and method mark the beginning of the era of modern census-taking in this country, and since that census the inquiries have been enlarged to cover many additional features with respect to population as well as the inclusion of many new subjects, which, particularly since 1880, have come to be considered as

* Paper read at the annual meeting of the American Statistical Association, Atlantic City, Dec. 29, 1908.

entirely legitimate matters for census investigation. But along with this great expansion in the character and extent of the census inquiries there is one subject at least concerning which altogether satisfactory results have not been obtained, and that is the return and classification of occupations; and it may in truth be said that it now constitutes the one feature of present-day census-taking in which there is the greatest need for improvement. It is a task, moreover, which presents many difficulties in its execution, and to what extent improvement in these respects can reasonably be expected is, after all, a matter of conditions; and it is largely for the purpose of setting forth these conditions as clearly as may be that this paper has been prepared. In other words, it is not the purpose to present or even suggest any particular scheme for the classification of occupations at the Thirteenth Census, but simply to state the conditions under which the work has been prosecuted in the past, and to indicate, so far as is now possible, the means by which it is hoped both to improve the quality of the returns themselves, and to make more effective the agencies of tabulation, so as to secure in the end a very much improved, if not wholly satisfactory, presentation of the occupations of the people.

The first inquiry with respect to occupations was at the Fourth Census, in 1820. It was not repeated in 1830, but, with this exception, there has been constant inquiry at each succeeding census as a part of the enumeration of population. There have been to date, therefore, eight censuses of occupations, and these fall naturally into three groups:—the first comprising the returns of 1820 and 1840; the second, those of 1850 and 1860; and the third, those of 1870, 1880, 1890, and 1900.

At the census of 1820, in conformity to the instructions provided for the marshals and their assistants who were charged with the duty of taking the census, a return was required of the number of persons (including slaves) engaged in each of three great classes of occupations, namely, agriculture, commerce, and manufactures. The inquiry was contained in the population schedule, and, under the system of enumeration

then in vogue, called for the entry against the name of the head of the family of the number in each family who were so employed. A similar inquiry was made in 1840, but the number of classes under which the members of each family were to be reported was increased to seven, as follows:—mining; agriculture; commerce; manufactures and trades; navigation of the ocean; navigation of canals, lakes, and rivers; and learned professions and engineers. There was no specific reference in the instructions as to the manner in which the number of persons in each class was to be determined, but the results of the inquiry clearly indicate that the returns comprehended, as in 1820, all the members of the family (including slaves) who were so occupied. The entries on the schedule were made in the same manner as in 1820, so that at each of these enumerations the primary assignment to the different classes by the census-takers was necessarily final, and no further classification was possible, the printed results representing merely the aggregations of the numbers reported for each individual family.

At the Seventh Census, in 1850, a specific return was required of the profession, occupation, or trade followed by each free male over fifteen years of age, and detailed instructions were given concerning the manner in which it was to be made. Under the requirements of the system of individual enumeration then inaugurated there were separate schedules for the free and the slave inhabitants, and, as the return of occupations was called for on that for free inhabitants only, and was further limited to males, it did not apply, as in 1820 and 1840, to females or to slaves. The results of the inquiry were presented in two ways: first, in an alphabetical list comprising 323 occupation designations and, second, in summarized form under ten general heads, as follows:—commerce, trade, manufactures, mechanic arts and mining; agriculture; labor, not agricultural; army; sea and river navigation; law, medicine, and divinity; other pursuits requiring education; government, civil service; domestic servants; and other occupations.

The census of 1860 was taken under the same provisions of law as that of 1850, and with practically the same schedules

and instructions, but the inquiry as to occupations applied to all free persons of both sexes over fifteen years of age instead of, as in 1850, to free males only. No attempt was made to group the results under main classes, as in the preceding census, and the statement of persons occupied was made, without distinction of sex, in the form of an alphabetical list comprising 584 different occupation designations.

The results of the inquiry at both of these censuses were reported under a large number of designations, as just shown; but there were, admittedly, many deficiencies in the returns for 1850,* and the grouping under general heads was not very successful; while, with respect to the returns for 1860, which were printed without comment in the report for that census, it is evident from statements by the Superintendent of the Ninth Census† that, like the returns of 1850, they were far from satisfactory, both as to their completeness and the detail in which the occupations were stated. There was opportunity, too, at the census of 1850, for the first time, to provide at a central office for a uniform basis of classification, but this was not possible because of the inadequacy of the returns themselves in many particulars; nor could there be any comparisons made at either census with the results of the earlier enumerations because of the changes in the population groups for which the later returns were required.

The Ninth Census, in 1870, was taken under the old law of 1850, although an unsuccessful effort was made to provide new legislation more nearly in keeping with the changed conditions under which it would have to be conducted. General Walker was made Superintendent, Feb. 7, 1870, and proceeded with great skill and expedition to take the best census possible under the existing conditions of law. The inquiry as to occupations was modified by striking from the schedule the age limitation of fifteen years and introducing in the instructions to marshals the limitation of ten years, in the belief, as stated in the report for 1870,‡ that "this inquiry ought to extend as nearly as

* Seventh Census, pp. lxvi and 1015.

† Ninth Census, Report on Population, p. xxxiii.

‡ Ninth Census, Report on Population, p. xxix.

possible to the whole body of persons of both sexes and all ages pursuing gainful occupations in the United States." The presentation of the tabulated results of the inquiry comprised 338 specifications, classified under four main heads, as follows: agriculture, professional and personal services, trade and transportation, and manufactures and mechanical and mining industries. The reasons for adopting this general classification, and the assignment thereunder of the various occupation designations, were also fully explained, thereby furnishing, for the first time, a definite basis for the enumeration and presentation of occupation data, to which, in the main, the work of succeeding censuses has conformed.

The census of 1880, of which General Walker was also the Superintendent, was taken under a new act, approved March 3, 1879, which entirely reorganized the census machinery, introducing the system employed at the present time. By this change the enumeration, which previously had been intrusted to the United States marshals and their assistants, was placed under the charge of supervisors, specially appointed by the President, with the consent of the Senate, and the returns were collected by enumerators selected by the supervisors, with the approval of the Superintendent of the Census. With respect to occupations there was practically no change in either the inquiry or the instructions from those used in the census of 1870, and the same methods were observed in the presentation of the results, but the number of occupation designations was reduced, mainly by consolidation, to 265.

The census of 1890 was taken under the provisions of a new act, approved March 1, 1889, but modelled upon that which governed the work in 1880. The instructions concerning the return of occupations were considerably elaborated, with the intention of having the enumerator describe, as accurately as possible, the occupation of each and every person at work, irrespective of age; but the tabulations, following the precedent of the two preceding censuses, did not include, in any case, persons under ten years of age. The general plan of grouping the occupations under main class heads was maintained, but

the arrangement of the various occupation designations with respect to classes differed somewhat from that of 1880, principally in the grouping of fisheries and mining with agriculture and in providing a class for persons engaged in professional pursuits separate from those engaged in purely domestic and personal service, thus making five main classes instead of four, as formerly, and with a still further reduction in the number of occupation designations to 218.

The passage of the act, approved March 3, 1899, which governed the taking of the Twelfth Census, marked an important departure in census-taking in this country. By this act the work at the decennial period was limited to four subjects,—population, mortality, agriculture, and manufactures; but provision was made after the completion of the decennial work for the collection of the statistics relating to many special subjects. This step became necessary because of the encyclopedic character of the work of the two preceding censuses, at which the attempt was made to carry on a host of special work substantially coincident with that required for the general enumeration of population and the collection of the statistics of industry; and, therefore, in these respects the census of 1900 was a marked improvement over its immediate predecessors. It did not appreciably reduce, however, the work attending the general enumeration of population, and the requirements with respect to the return of occupations by the census enumerators were substantially the same as in 1890. In the presentation of the statistics there were 303 designations of occupations, arranged under 140 occupation groups, and conforming, as nearly as possible, to the general classification used at the preceding census.

These are, in brief, the facts of the enumeration and presentation of occupations in the Federal census; but what of the conditions under which the work has been conducted? There need be no consideration in this regard concerning the first two groups, comprising the earlier efforts to secure occupation data, because in each case the basis differed and the returns were not inclusive of all the gainful workers. For the third group, com-

prising the last four censuses, the basis for the return and presentation of occupations established by General Walker in 1870 has been, in the main, observed, although the effectiveness of many of the occupation designations, as describing the groups of workers therein included, has been very much lessened on account of the increasing degree to which labor has been subdivided. The results have been presented in varying detail as to the number of occupation designations used, but covering for each census substantially all the gainful workers of both sexes and of all ages.

There has been at each of these censuses forced conditions of work, arising out of a wholly temporary organization and with entirely too short a time to prepare for so great an undertaking. And thus it would seem to have been a well-nigh impossible task, particularly since 1880, to bring together suddenly a large clerical force; to provide for their housing in widely scattered quarters; to map out a complete plan of work to govern the operations of both the office and field force; to prepare and print the necessary schedules and instructions, amounting in 1900 to very nearly 26,000,000 copies; to provide for the appointment of several hundred supervisors, and through them for the selection and equipment of a small army of enumerators,—more than 53,000 in 1900; and in time to begin work, under the law, on June 1, barely one year after the passage of the main census act, to say nothing of supplemental legislation at a much later date by which the plan of work was considerably modified. It is evident, therefore, that under this stress of work there could be, even at the Twelfth Census, but little, if any, provision made, except through the printed instructions, for training the field force or for the close supervision of their work during the course of the enumeration; nor was there, indeed, much opportunity for the detailed examination of the completed schedules before they were required to be sent to the central office at Washington. The supervisors, it is true, were furnished with instructions concerning the manner in which the schedules in general were to be scrutinized for omissions and possible error, but, aside from establishing the completeness of the canvass in

each census district, the necessities of the work, under the time limit prescribed for its completion, demanded a degree of expedition in the return of the schedules which precluded their critical examination, even though the supervisors' offices were fully equipped for the work, which was not always the case. As a consequence, the census officials were practically helpless in the matter, and in general were compelled to accept the entries on the schedules as they came to them, and to tabulate them accordingly. As the census has been carried on to date, therefore, the return of occupations in the detail essential to their proper classification has rested largely upon the printed instructions to the census enumerators and the integrity and interest with which they have performed their duties under them.

Fortunately for the Thirteenth Census, this era of census adversity is or ought to be largely now a matter of history, and, as we approach the active period of this great work, there is much reason to hope for improvement at many points, not the least of which is with respect to the return and classification of occupations.

The first and foremost basis of this hope rests in the fact of a permanent bureau, with a strong nucleus of trained experts and experienced clerks. The former temporary census organization was fatal to concerted effort, and the preparations covering so wide a range of operations were too hurried, and therefore necessarily incomplete and insufficient in many particulars. The permanent organization should have been effected at least twenty years ago, and every census superintendent from General Walker down has given freely of his testimony as to what the outcome was likely to be in the near future unless there was a material change in the plan of work. Happily, the present Director, having a permanent bureau to begin with, can look forward with hope to the coming of the Thirteenth Census, and emphasize, as he has already done before the committees of Congress and in his annual reports, some of the agencies through which must come material improvement in the conditions surrounding the work at the period of the general enumeration, for example: (1) the change of the date of enumera-

tion from June 1 to April 15, thus providing for a more nearly complete enumeration of the population—particularly that in cities—than has ever before been possible; (2) the omission of the mortality schedule and the entire withdrawal of the manufactures schedule from the general canvass, thus limiting the work of the census enumerators in cities to but one schedule,—population,—and in country districts to but two schedules,—population and agriculture; (3) the provisions for a smaller enumeration district, for increased and graded compensation for both supervisors and enumerators, better organization for and much closer supervision of the field work, opportunity for longer preliminary training of both supervisors and their assistants, and, as a consequence, the possibility of better provision for the examination in and correction from the supervisors' offices of all the returns, including occupations; and last, but not least, (4) the amplification of the returns with respect to occupation, so as to include the class of worker (employer, employee, or working on own account) and, if possible, by whom employed, thus affording, to the extent that the inquiries are successful, the means for the better classification of the occupation data, particularly in industry. Although the census officials have not been unmindful of the desirability of securing information of this character, as is done in some of the European countries, it has not been deemed advisable heretofore to attempt it, because of the temporary character of the census organization and the "forced" conditions of the work generally, as already explained.

Thus it will be seen that it is the purpose to strengthen the work of the enumeration in every way possible, but with all our hopes we must not lose sight of the fact that there are limitations which are inherent and to an extent ineradicable. We may hope to improve materially the quality of the returns, but we shall not be able to get just the facts we are seeking. From the nature of the case it is difficult, first, to secure everywhere enumerators that in all respects fill the bill; and, second, even though they be of the right stamp, the answers to the inquiries cannot always be secured at first hand, and so the

returns will not state the facts as explicitly as is desired and as the instructions require. In theory, it is possible, under a permanent organization, to provide for the early selection, appointment, and training of the enumerators,—far in advance of the need for their services,—but, as a matter of fact, many changes are bound to occur in any list of original selections, however or whenever made up, before the census day is at hand; and experience teaches us that there are likely to be, too, many vacancies to be filled on the morning of the day when the work begins and throughout the course of the enumeration as well. The causes for changes in enumerators are many and varied,—sickness, death, new employment offered, change of mind, indifference to work, because found to be too uninviting, too exacting, or not sufficiently profitable,—so that the original list of selections is subject to considerable revision at a later day, a “waiting list” becomes a necessity, and it is often necessary and desirable, when the work is well advanced towards completion, to utilize the services of an enumerator who has proven his worth in one district in carrying on or completing the work in a second district. So large a body of enumerators is, after all, as in times past and in most countries, likely to be made up of good, bad, and indifferent workers, widely scattered as they are over a large area of country, and largely dependent for their selection, early equipment, and instruction upon a body of supervisors who have had, on the whole, no previous census experience, and who, as business men of their respective localities, cannot devote much time to purely preliminary study in advance of the actual preparatory work, so that the matter of successful enumeration finds its foundation largely in the ability of the supervisor to direct the work of the enumerators, and in the use of good business sense in meeting the emergencies which will arise inevitably during its progress, and which, in all respects, cannot be anticipated through previous instruction, either written or oral.

In the preparations for the Thirteenth Census one other step is to be taken which, so far as it may help to clear up the situation with respect to occupations, is undoubtedly the most

important one of all, and that is the preparation of a complete index or glossary of occupations as returned at the Twelfth Census, involving three considerations as follows:—

(1) A full statement of the exact terms or designations under which upwards of 53,000 enumerators returned the occupations of those gainfully employed.

(2) A measure of the numerical importance of each occupation term or designation so used, as indicated by the number of persons reported in each case.

(3) The formulation of exact definitions of all significant terms or designations, particularly with reference to local usage in different sections of the country.

In tabulating the population returns of the Twelfth Census, provision was made for a subdivision of the work of classifying occupations, part being done by the large punching force and part by a special corps of clerks set apart for this purpose. The reasons for so dividing the work are fully explained in the special report on occupations,* as follows:—

... An index to occupations, based upon that used at the census of 1890, was ... prepared in advance of the receipt of the enumerators' completed returns, in which, for purposes of tabulation, each of the more important terms likely to be used in reporting the classes of work carried on by persons engaged in gainful labor was assigned to one of 475 occupation groups. It is not the intention to make this index list exhaustive, because, in classifying the statements of the enumerators under the various occupation groups, the plan was to confine the primary work to the simpler designations (such as farmer or planter, farm or plantation laborer, clergyman or preacher, lawyer, physician or doctor, school teacher, carpenter, mason, painter, blacksmith, dressmaker, milliner, seamstress, etc.), for which the classification was apparent on the face of the returns, reserving all other designations for more careful scrutiny and examination before their final assignment to a specific occupation group.

Every effort was made, so far as the limitations of the work permitted, to make the several occupation groups as complete as possible. To this end the primary classification work was

* Occupations at the Twelfth Census, pp. xxi-xxii.

confined, as already stated, to the simpler designations, comprising in all 391 different items, or occupation terms and, comprehending (in part only) less than one-half (225) of the 475 occupation groups selected for tabulation purposes. Under the system of machine tabulation used in the population work of the Twelfth Census, this primary work was conducted in connection with the punching of the cards from which the detailed tabulations of general population data were derived, in order to cover as much ground as possible within the limited time at the disposal of the office. Specific instructions were issued to have this part of the work comprehend only the 391 items previously selected, and to punch all other returns of occupations under the general heading "Ot," meaning thereby "other" occupations. These, as already explained, were reserved for further examination. For this purpose provision was made in the course of the tabulation work to have these "Ot" cards thrown out mechanically by the tabulating machines for a separate handling and the transcription thereon of the occupation designation in the language used by the enumerator on the population schedule. When this process had been completed, assignment was made in each case to one of the 475 occupation groups, and reference was made to the schedules for manufactures and agriculture as a guide in making the assignment, wherever possible. . . .

The index of occupations which is to be prepared from the returns of the Twelfth Census, when complete, will not only furnish the means for better and clearer instructions to the enumerators at the Thirteenth Census but will also enable the Census Office to provide for a more logical classification of occupations at that census, as determined by actual returns, rather than, as has heretofore necessarily been the case, from, in large measure, theoretical considerations.

General Walker did not overstate the case when he said, in the report for 1870,* that "next to the actual count of living inhabitants, for the purpose of distributing representation, the most important single inquiry of the census is in regard to the occupations of the people," but under the conditions which have governed the work of the census to the present time it has constituted a problem increasingly difficult in its execu-

* Census of 1870, Report on Population, p. xxxiii.

tion and without much hope of betterment until the census was put on a more stable footing. All should welcome, therefore, the opportunity which is presented, for the first time, through the organization of a permanent bureau, for the carrying on of so important a work under the best conditions possible, and in the effort to improve the census classification suggestions are freely invited and will be most cordially welcomed.

There is, indeed, great need for a more satisfactory classification of occupations,—one that will meet, as near as may be, the wants of each and all,—and no more imperative need for such a classification exists anywhere probably than in the census itself, as affecting more or less all of its more important branches.

From the point of view of more useful mortality statistics of occupations, there are two things of chief importance: (1) to provide for a more definite statement of the occupation in the population schedule and the certificate of death; and (2) to construct a reasonably limited list of important occupations which can be clearly defined and concerning which definite instructions can be given. In a measure it is possible to meet both of these needs, if the plans proposed for improving the return of occupations on the population schedule at the Thirteenth Census, on the one hand, and the effort which is now being made to secure a more specific statement of occupation on the certificate of death, on the other hand, shall prove reasonably successful, as is confidently expected. The list of occupations to be selected should not be too large,—perhaps from 100 to 200 definite occupations would be sufficient for a beginning,—and it should include such occupations as are numerous in all, or even some, of the registration states, as well as those of special interest on account of their dangerous character, but, in any event, only such as are capable of being defined with some degree of precision. The instructions to accompany them should agree exactly with the instructions which will be sent out to the enumerators of population, and care should be had to clearly define the occupations thus selected

and to state their inclusions, so that all may know what kinds of labor are actually embraced in them.

In respect to agriculture, too, there is equal need for definite information concerning the number of persons so occupied as revealed by the census of population, not only because a means is thus afforded for testing the correctness of the agricultural returns,—a most important consideration in itself,—but because the schedules of agriculture contain no inquiry as to the number of persons employed on the farms or in kindred pursuits. Effort was made at the Twelfth Census to bring the statistics of agriculture into greater harmony than theretofore with the statistics of occupations and of farm proprietorship as reported on the population schedule, and, while this attempt at co-ordination was not fully successful, it was a great improvement over any preceding census. It leads to the hope, too, that, with the broadening of the work with reference to the population inquiries, another step forward may be taken at the Thirteenth Census, and, while full co-ordination is not expected, that a much closer relation may be established between the returns of these two branches of the general census work. The problem with respect to manufactures, on the other hand, presents many difficulties, and the outlook in this direction is not so promising. There has always been great disparity between the returns of persons occupied, as given on the population schedule, and those representing salaried employees and wage-earners, as given on the manufactures schedule, and the conditions governing the two collections are so dissimilar that comparisons are hardly practicable; and they will become all the more difficult if, as now proposed, the census of manufactures shall exclude, as in 1905, the so-called neighborhood, household, and hand industries.

The law now provides for a census of manufactures every five years, and the present Congress is likely to provide for a census of agriculture, on a somewhat restricted basis, in 1915, but no similar provision for a more frequent census of population is contemplated. The need for enumerating the population oftener than once in ten years was recognized as early as in

1880, when the new census act contained a section under which any state or territory, by complying with certain conditions, could take an interdecennial census of population and be reimbursed by the Federal government for a considerable proportion of the total amount so expended. This provision was made a part of the Tenth Census act, at the suggestion of General Walker, but it has not been renewed in any subsequent census act. In 1885 censuses were taken under the requirements of the law of 1880 in Colorado, Dakota, Florida, Nebraska, and New Mexico. Copies of these returns were filed as required in the office of the Secretary of the Interior, but no use was made of them by the United States government, principally because of the lack at that time of a permanent census organization. Several other states also took a census in 1885, but under the provisions of state laws and wholly at the expense of the state; and there are to-day something like 25 states in which there are laws providing for a census of population and of other subjects. In many of these states, however, this provision of law is largely inoperative, and in only a little more than one-half of them has a census been taken recently under the direction of the state government.

An examination of the state census reports shows that there were fourteen states which took a census in 1905, and that for eight of them statistics of occupations are presented in more or less detail, but with little or no uniformity with respect to classification. For four of the eight states which deal with occupations, the presentation is made for a limited number of occupation groups, of no special value statistically, and in only one instance is there any explanation as to what classes or kinds of occupations are included in each group. In each of the other four states several censuses have been taken under state authority, and the subject of occupations has been made, in each case, a matter of constant inquiry and presentation.

In one of these states—Iowa—the census reports show, for 1885, an alphabetical list of occupations embracing 81 specifications; for 1895 a similar list of occupations, but comprising 147 specifications; and for 1905 a presentation by main

classes and principal occupation groups, representing substantially a condensation of the Federal classification of 1900, and comprehending all persons ten years of age and over. In another state—Kansas—the presentation at each of the last four censuses relates to persons twenty-one years of age and over and is confined to a statement of occupations by main classes only, apparently following, in each case, the Federal classification of 1870.

The third of the four states under consideration is Massachusetts,—in many respects the pioneer in statistical work and investigation,—and in this state the subject of occupations has naturally received a great deal of attention. There were presentations of occupations at the first two state censuses, in 1855 and 1865, but they were limited, in the one case, to free males over fifteen years of age and, in the other, to free males and females of the same age limit, following the lead of the Federal enumerations which preceded them. In 1875 there was an extended presentation of occupations, embodying the classification of the English and United States censuses, and embracing the entire population, productive and non-productive. It comprised over 1,600 designations of occupations arranged under 79 subgroups, which, in turn, were referred to 7 general classes. At the next census, in 1885, a very much more minute subdivision of occupations was attempted, representing 22 general classes, 128 subclasses, and over 17,000 specifications, but differing materially from the classification of the preceding census. In 1895 the detailed presentation of occupations was reduced to something less than 4,000 specifications, but arranged, as in 1885, under 22 general classes and about the same number of subclasses. The report on occupations for the census of 1905 not having appeared yet, no information as to the latest form of presentation is now available.

In Rhode Island—the fourth state considered—the occupations were reported in 1865 in the form of an alphabetical list only, but in 1875 they were presented under main class heads, in accordance with the Federal classification of 1870. In 1885 and 1895, however, the presentation of occupations conformed,

in the main, to the Massachusetts classifications, but with very material condensations in the number of separate specifications used at each census. In 1905 the statistics of occupations were limited to persons thirteen years of age and over, and no attempt was made to arrange the occupations under main class heads, but the various specifications, presented in alphabetical order, conform, in general, to the designations of the Federal census. In one other state—Michigan—there was also constant inquiry as to occupations up to 1904, when for some reason it was abandoned. In this state,—which takes its census one year earlier than other states,—the presentation of occupations in 1874 was confined to male adults, and consisted simply of an alphabetical list comprising several hundred specifications, without attempt at classification or condensation, but in 1884 and 1894 the presentations were extended to cover all persons ten years of age and over and followed, with some variations, the Federal classifications of 1880 and 1890.

It is evident, therefore, that the presentation of occupations in the state census reports has followed no general rule and that there is but little uniformity in the successive publications. And so here, as in other fields, the permanent census bureau finds its opportunity, and should make the most of it. There should be a census of population every five years at least, and if it is not possible to have the midway census taken wholly under the auspices of the Federal government, as an essential factor to the completeness of its own census system, then every effort should be made to stimulate the work of the state governments in this direction, both in sharing the cost of the state enumerations and in “standardizing” the schedules of inquiry and the instructions concerning them.

It is evident, too, that in foreign countries the return and classification of occupations have not yet been reduced to an exact science and that the work of improvement is still going on. In the foreign censuses, as in our own, much the same difficulties of enumeration have been encountered, and there have been frequent changes in the classifications under which the statistics have been presented. Occupations are still ex-

pressed in general and indefinite terms, and much effort has been expended to perfect the work so as to admit of as precise classifications as possible. The inquiry with respect to occupations has been subdivided, much more definite and specific instructions have been formulated, and in two or three countries the work has been extended to include the preparation of a comprehensive index of occupations covering many thousand specifications. The International Institute of Statistics, also, adopted at its session in 1893, after much consideration, an international classification of occupations, capable of elaboration or compression to suit the varying needs of the work in different countries, and at its last session, in 1907, named a commission to prepare a technological glossary, in English, French, and German, of the designations of industries and occupations which have been employed in the censuses of leading countries, accompanied by a brief but exact description of the character of the work covered by each term so used. This commission has two American representatives, Director North and Professor Willcox, and its first report is to be made at the next session of the Institute, at Paris, in May, 1909. A partial contribution by this country is already possible, through the descriptions for certain industries supplied in the census report on "Employees and Wages," but, by the completion of the more extended index covering the work of all the enumerators at the Twelfth Census, this country will be in a position to render much more effective service to so important an enterprise. As Director North, in his last annual report, has said, "The United States has not hitherto been able to contribute aid of scientific value in this study, because there has been no opportunity, in the absence of a permanent office, to subject the enumerators' returns to critical analysis. This opportunity has now arisen; and I look for results, as the outcome of the present work, which will constitute one of the most valuable contributions the United States has yet made to the science of statistics."

And so at every point of contact, almost, there is opportunity for improvement and reasonable hope of attaining it, through

the combined effort of all who are vitally interested, thus helping to forge another link in the chain of census improvement, proceeding naturally from the organization of a permanent office, so long delayed, and to the lack of which can be charged some of the insufficiencies of former census efforts, in this as in other directions.

STATISTICS OF DIVORCE.*

BY JOSEPH A. HILL.

In preparing the introductory paper on this subject of divorce, I have assumed that it was my function to present simply the figures,—the dry statistical Gradgrind facts,—knowing that those who follow me have devoted special thought and study to the sociological significance of divorce, and anticipating that they will draw appropriate inferences from these figures, point conclusions, and perhaps suggest what ought to be done, if anything. Of the statistical facts that are available, the most significant, and, it might be said, the most portentous, is the enormous increase in divorce revealed by the recently published census figures.

The Increase of Divorce.—The total number of divorces returned by the recent census investigation, which covers the twenty years from 1887 to 1906 inclusive, was 945,625. In the preceding investigation, covering the twenty years from 1867 to 1886 inclusive, the number reported was 328,716, or hardly more than one-third (34.8 per cent.) of the number recorded in the second twenty years.

At the census of 1870 the population of the United States was 38,558,371. The number of divorces granted in that year was 10,962. Thirty-five years later, when the population had increased to 82,574,195, the annual number of divorces was 67,791. So, while the population had hardly more than doubled, the number of divorces had become six times as great as it was at the beginning of the period. In 1870 the divorce rate per 100,000 population was 29. It advanced to 32 in 1875, to 38 in 1880, to 44 in 1885, to 53 in 1890, to 58 in 1895, to 73 in 1900, and to 82 in 1905.

Thus the divorce rate based on total population was almost three times, or, more accurately, two and five-eighths times as

* Paper read at a joint meeting of the American Statistical Association and the American Sociological Society at Atlantic City, Dec. 30, 1908.

great in 1905 as it was in 1870. The contrast may perhaps be more effectively presented as follows: If the number of divorces in proportion to population had been the same in 1905 as it was in 1870, the absolute number of divorces reported in 1905 would have been only 24,000, whereas it was, in fact, 67,791. In 1906 the actual number was 72,062, while the ratio of 1870 would have resulted in only 24,398.

A more significant divorce rate is that based either upon married population or upon married couples. The number of married people is accurately known only for census years, 1890 and 1900. But for other years it may be estimated with sufficient accuracy for the purpose of computing a rate. In the year 1905 the number of divorces per 100,000 (estimated) married population was 255, which is equivalent to 2.55 divorces per 1,000 married population. It may be assumed that 1,000 married people represent 500 married couples. The divorce rate per 1,000 married couples was therefore 5. That is to say, 5 married couples out of 1,000 were being divorced annually at the period represented by the figures for the year 1905. Five years earlier, in 1900, the divorce rate was 4 per 1,000 married couples. Ten years prior to that, in 1890, it was 3; in 1880 it was 2; and in 1870 it was $1\frac{1}{2}$. So in thirty-five years the annual divorce rate has advanced from $1\frac{1}{2}$ per 1,000 married couples to 5 per 1,000 married couples.

Year.	Divorces.		Year.	Divorces.	
	Total Number.	Increase over Preceding Year.		Total Number.	Increase over Preceding Year.
1906	72,062	4,086	1886	25,535	2,063
1905	67,976	1,777	1885	23,472	478
1904	66,199	1,274	1884	22,994	*204
1903	64,925	3,445	1883	23,198	1,086
1902	61,480	496	1882	22,112	1,350
1901	60,984	5,233	1881	20,762	1,099
1900	55,751	4,314	1880	19,663	2,580
1899	51,437	3,588	1879	17,083	994
1898	47,849	3,150	1878	16,089	402
1897	44,699	1,762	1877	15,687	887
1896	42,937	2,550	1876	14,800	588
1895	40,387	2,819	1875	14,212	223
1894	37,568	100	1874	13,989	833
1893	37,468	889	1873	13,156	766
1892	36,579	1,039	1872	12,390	804
1891	35,540	2,079	1871	11,586	624
1890	33,461	1,726	1870	10,962	23
1889	31,735	3,066	1869	10,939	789
1888	28,669	750	1868	10,150	213
1887	27,919	2,384	1867	9,937	

* Decrease.

With only one exception the number of divorces has increased every year during the forty-year period covered by the statistics. But the amount of the annual increase has fluctuated widely. From the year 1867 up to and including the year 1879, the annual increase never equalled 1,000. Then in the year 1880 it jumped to 2,580. In the next year it fell back to 1,099, and in the year 1884 it changed to a decrease, the number of divorces in that year being less by 204 than in the preceding year. This is the one exception to the rule of constant increase. The increase again reached the 2,000 mark in the year 1886, and two years later, in 1888, it dropped to 750; but the year following, 1889, it reached a new maximum, being in excess of 3,000. It was eight years before that record was broken, and in that interval the increase went down to 889 in the year 1893 and to only 100 in the year 1894. In 1898 it again exceeded 3,000, and increased rapidly the next four years, reaching a new high record in the year 1901, when the number of divorces granted

was greater than the number granted in the preceding year by 5,233. In the next year following, 1902, the increase was abnormally small, being less than 500. It went up to 3,445 in 1902, fell off to 1,274 in the next year, then moved up again, reaching 4,086 in the year 1906, which is the last year of the period for which we have statistics.

It is not to be expected that all these variations can be explained. But it is apparent that commercial crises have a marked effect in retarding the growth of divorce. Professor Willcox called attention to this fact in a discussion and analysis of the divorce statistics compiled by the earlier government investigation covering the years 1867 to 1886.* His conclusion that the divorce rate is retarded by financial crises finds confirmation in the results of the present investigation, as is witnessed by the very small increase of divorces following the financial crisis of the year 1893.

In the four years beginning with the panic year of 1893 the number of divorces increased from 36,579 (the number in 1892) to 42,937, an increase of 6,358, or about $17\frac{1}{2}$ per cent. On the other hand, there is no period within the forty years covered by the statistics when divorces increased as rapidly as they did in the four years following the year 1897. These, it will be remembered, were years of great business prosperity, or, in popular parlance, "boom years." In 1897 the number of divorces was 44,699; in 1901 it was 60,984, an increase of about $33\frac{1}{2}$ per cent. as compared with an increase of only $17\frac{1}{2}$ per cent. in the four years following the panic of 1893.

The statistics, so far as I have been able to analyze them, throw little light upon the reasons for this contrast. The number of marriages annually contracted falls off in periods of financial depression, and the possibilities of divorce are to that extent diminished. I have computed that, if the annual increase in the number of divorces granted in the four years 1892 to 1895 had been as great as it was in the four preceding years, the number of divorces granted in the second four years would have been greater than it was by 7,732. I have also

* "A Study in Vital Statistics," *Political Science Quarterly*, Vol. VIII, No. 1.

computed that, if the annual increase in the number of marriages during the four years preceding the panic had been maintained for the next four years, the number of marriages contracted in the later period would have been greater than it was by 137,268. Now it seems reasonable to charge up some of the divorces that did not take place to the marriages that did not take place. But that does not go far towards explaining the deficiency in the increase of divorces as compared with the preceding four years. The other reasons which may be adduced to explain this phenomenon are necessarily more or less conjectural.

It might be suggested that men live more sober and decent lives under the stress of financial adversity, and therefore give less cause for divorce. Or is the reason more prosaic and directly financial? Is it because in hard times the cost of lawyers' fees has a greater restraining influence upon the husband or wife who is contemplating divorce? Again, do those wives who may have to face the alternative between abiding by an unhappy marriage and earning their own living hesitate longer when the chances for remunerative employment are not very encouraging? On the other hand, it would seem as if wife-desertion and non-support, which are two important grounds for divorce, would be more frequent when the burden of providing for a family is accentuated by the loss of income or earning capacity consequent upon an economic crisis.

Divorce Rate Highest in the West.—There is a wide range of variation in the divorce rates in the different parts of the United States. The rate is much lower in the Eastern states than in the Western. In the North Atlantic Division, which comprises the New England states and the states of New York, New Jersey, and Pennsylvania, the divorce rate in 1905 was 42 per 100,000 estimated population. In the Western Division, which comprises all the states lying west of the second tier of states beyond the west bank of the Mississippi, the rate was 152. In the North Central Division the rate was intermediate between these extremes, being 105.

Geographic Division.	1905.	1900.	1890.	1880.	1870.
Divorces.*					
Continental United States	68,746	55,502	33,197	19,143	11,207
North Atlantic	9,706	8,069	5,337	3,995	3,163
South Atlantic	4,727	3,447	1,885	951	485
North Central	29,635	25,405	15,859	9,485	5,806
South Central	17,692	13,316	6,883	3,146	1,186
Western	6,986	5,265	3,233	1,566	567
Divorce Rate per 100,000 Population.					
Continental United States	† 83	73	53	38	29
North Atlantic	42	38	31	28	26
South Atlantic	42	33	21	13	8
North Central	105	96	71	55	45
South Central	114	95	62	35	18
Western	152	129	104	89	57

* Annual average for the five-year (in 1905, three-year) period of which the median year is the year specified above; *e.g.*, for 1870 the number is the annual average for the years 1868 to 1872, inclusive.

† Based on the estimated population for 1905.

It is generally assumed that, as time goes by, the contrast between the East and the West as regards social and economic conditions tends to disappear or becomes less marked. This may be true in most respects, but there is no indication of such a tendency as regards the prevalence of divorces in the two sections of the country. The divorce rate is increasing in all parts of the United States; but in the East the increase is comparatively slow, while in the West it is much more rapid, so that the two sections appear to be drawing farther apart in this respect instead of nearer together.

The divorce rate in the North Atlantic Division advanced from 26 in 1870 to 28 in 1880, a gain of two points, if one may use a convenient stock market word; from 1880 to 1890 there was an advance of three points; between 1890 and 1900 an advance of seven points; and between 1900 and 1905 an advance of four points. In the Western Division, on the other hand, the di-

divorce rate advanced from 57 in 1870 to 89 in 1880, a gain of 32 points; then to 104 in 1890, a gain of 15 points; then to 129 in 1900, an advance of 25 points; and finally to 152 in the year 1905, a further advance of 23 points. In 1870 the divorce rate in the Western Division was hardly more than twice as large as it was in the North Atlantic Division, while in 1905 it was more than three and one-half times as large. So the gap between these two sections as regards the divorce rate appears to be widening.

There has been, in fact, a notable change since 1870 in the rank of the five main divisions as regards the divorce rates. In 1870 the highest divorce rate was that of the Western Division, the North Central ranking next in this respect, the North Atlantic third. Then came the two southern divisions, the South Central and the South Atlantic, in the order named. In 1905 the first rank was still held by the Western Division, but the South Central Division had now advanced to the second place, thus displacing the North Central Division, which formerly ranked second, but now ranked third. The two remaining divisions, the North Atlantic and the South Atlantic, tied for the last place in 1905, each having a divorce rate of 42 per 100,000 population. But the movement of the rates in these two divisions indicates very clearly that the South Atlantic Division is destined to outrank the North Atlantic, and that the latter division, accordingly, will have in the future the distinction of being the section of the country which has the lowest divorce rate. In fact, in the North Atlantic states the comparatively slow advance of the divorce rates almost justifies the hope that this section of the country, at least, is approaching a stationary condition as regards divorces. But in other parts of the United States there is not even a suggestion of such a probability.

It is quite likely that the advance of the divorce rate in the North Atlantic states is retarded by the influx of immigrants in that section of the United States. We have, it is true, no direct statistical measure of the difference between the foreign-born and the native population as regards frequency

of divorce. But there is at least a presumption that divorce is less usual among immigrants than among native Americans.

There is a similar lack of data in reference to the difference between the negro and the native white race as regards the prevalence of divorce. It is alleged that divorces in the South are more frequent among the negroes than among the white people, and that this largely accounts for the increase in divorces in the Southern states. This statement rests upon the oral testimony of court clerks and divorce lawyers.

The time has come when steps ought to be taken to institute an official annual registration of divorces under the supervision of the United States Census Office. When this is done, we can secure the data which possess the greatest value for a sociological and scientific study of the subject of divorce, and it will be possible to reach definite conclusions regarding such questions as those just suggested. At present we have to be content with such data as the courts find it desirable to record for judicial purposes.

It is not easy to account for the wide variations in the divorce rates in different states and territories. The results are affected by a great variety of influences. The composition of population as regards race or nationality; the proportion of immigrants in the total population, and the countries from which they came; the relative strength of the prevailing religions, and particularly that of the Catholic faith; the variations in divorce laws and in the procedure and practice of the courts granting divorce; the interstate migration of population, either for the purpose of obtaining a divorce or for economic or other reasons not connected with divorce—all these are factors which probably affect the divorce rate. It is perhaps natural to look first of all to the figures for the state of South Dakota. But the divorce rate in that state (270 per 100,000 married population), although above the average, is by no means the highest in the several states. It is hardly higher than in North Dakota (268), and not as high as in Indiana (355), which has the highest divorce rate of any state east of the Mississippi. Still higher rates prevail in Texas (391) and in Arkansas (399). In general the rates are highest in the Western states,

the highest rate shown for any state being that for the state of Washington (513). Next comes the state of Montana, with a rate of 497, and then Colorado, where the rate is 409.

Remarriage of Divorced Persons.—Another interesting question in relation to this subject is that of the extent to which divorced people remarry. Here, again, there is a lack of statistical data. In this country, so far as I am aware, the only statistics bearing on the question are those compiled by the states of Maine, Rhode Island, and Connecticut in which persons marrying are classified with respect to their prior marital states, whether single, widowed, or divorced. In eighteen years from 1889 to 1906, inclusive, the aggregate number of divorced persons remarrying in the state of Rhode Island was 3,639, which is 28 per cent. of the number of persons who were divorced in that state during the same period. This would suggest that rather more than one-fourth of the divorced persons remarry. But, of course, in consulting these figures we must recognize the fact that some of the divorced persons remarrying in Rhode Island had been divorced elsewhere, and some of those divorced in that state remarried elsewhere. The Connecticut figures would suggest a somewhat larger proportion of remarriages, since in that state the number of divorced persons remarrying in the years 1900 to 1907, inclusive, was about 36.5 per cent. of the number of persons divorced in the same period. In Maine the remarriages in the period 1892 to 1906 were equivalent to 33.3 per cent. of the divorces.

Of course, it cannot be assumed that every remarriage of a divorced person represents a case in which one marital bond was severed for the sake of contracting another. That a certain proportion of divorced persons should remarry is as natural and inevitable as that a certain proportion of the widowed should remarry. It is perhaps more likely to happen because the divorced as a class are younger than the widowed. The case in which A divorces B in order to marry C may not be unusual, but it certainly is not typical of the great majority of divorce cases. On the contrary it probably represents only a small proportion of the total number of divorces granted.

Comparison with Foreign Countries.—In presenting the following table, which gives population and divorce statistics for Australia, most of the European countries, and the United States, I shall not attempt to account for the wide variations in the divorce rates. Among western nations the primacy of the United States in this respect appears to be established beyond the possibility of question. Switzerland, the country which among those here considered ranks next to the United States, has a divorce rate less than one-half as great. Noticeably small is the divorce rate for Austria, England, and Scotland; and in Ireland the statistics of divorce suggest the celebrated chapter on snakes in that country. In the five-year period covered by the above table there was 1 divorce in Ireland.

Country.	Census Year.	Population.	Divorces: Annual Average.*	
			Number.	Per 100,000 Population.
Australia, Commonwealth of	1901	3,773,248	359	10
Austria	1900	26,150,708	179	1
Belgium	1900	6,693,548	705	11
Bulgaria	1900	3,744,283	† 396	11
Denmark	1901	2,449,540	411	17
France	1901	38,961,945	8,864	23
German Empire	1900	56,367,178	8,680	15
Prussia	1900	34,472,509	5,291	15
Saxony	1900	4,202,216	1,209	29
Bavaria	1900	6,176,057	491	8
Great Britain and Ireland:				
England and Wales	1901	32,527,843	568	2
Scotland	1901	4,472,103	175	4
Ireland	1901	4,458,775	†	†
Hungary, Kingdom of	1900	19,254,559	‡ 2,130	‡ 11
Italy	1901	32,475,253	‡ 819	‡ 13
Netherlands	1899	5,104,137	512	10
New Zealand ¶	1901	772,719	92	12
Norway	1900	2,221,477	129	6
Servia	1900	2,492,882	312	13
Sweden	1900	5,136,441	390	8
Switzerland	1900	3,315,443	1,053	32
United States	1900	75,994,575	55,502	73

* For the five-year period of which the census year given is the median year except for Bulgaria and Servia.

† Average annual number of divorces 1896-1900.

‡ Annual average less than 1. Only one divorce granted during the five-year period.

§ Annulments included with divorces.

¶ Legal separations.

¶ Exclusive of Maoris.

The Occupations in which Divorces are most Usual.—As stated in the Census Bulletin on Divorce, the attempt to classify divorces by occupation of the husband, or of the wife in those cases where she had a gainful occupation, was not very successful. The occupation of the husband was on record in only about one-fourth of the total number of divorce cases. The degree of deficiency varied widely in different states. In some states the occupation of the husband was recorded in more than one-half of total number of divorce cases. In Maine, New Hampshire, Massachusetts, and Connecticut there was practically no record of occupations.

This variation seriously impairs the value of the totals obtained for the entire country, since some states are not represented at all in these totals, while others have more than their due weight. It is evident that the omission of practically all data for the four New England states just mentioned must produce a deficiency in the relative importance of the occupations associated with the textile industries and other manufacturing pursuits. It is quite likely also that the larger percentage of returns secured from many of the Western states may have exaggerated the relative importance of agricultural pursuits. For these reasons not very much stress is laid upon the occupational totals for the United States, although these totals have been presented in the Census Bulletin. But the figures for those individual states where a return of occupation was secured in a considerable proportion of the total number of divorce cases are believed to possess significance and to be worthy of study. The state in which the returns were most complete was New Jersey. Here the occupation of the husband was on record in 81 per cent., or four-fifths, of the total number of divorce cases. The Census Bulletin gives the occupational classification of the husbands divorced in that state and for purposes of comparison the corresponding classification of the number of married males enumerated in the same state at the census of 1900. It also gives the ratio of males divorced in each occupation during the twenty years covered by the census investigation to the total number of married males reported

in the same occupation at the census of 1900. We find, for instance, that among agricultural laborers in New Jersey there was 1 divorce recorded to every 113 married males, among farmers 1 to every 92 married males, among actors and professional showmen 1 to every 6 married males. These ratios are not to be regarded as divorce rates. For instance, the ratio for actors does not mean that in each year one-sixth of the married actors procure a divorce; for the comparison is between the total number of actors obtaining a divorce in twenty years and number of married persons in this profession on a given date,—namely, the date of the census of 1900. A nearer approach to a divorce rate would be obtained if we took one-twentieth of the total number of divorces recorded, which would be the annual average, and compared it with the number of married males in the profession. That would make the annual divorce rate for actors 1 to 120 married males. But not much reliance could be placed upon a rate obtained in that way and from these incomplete data. I am of the opinion, however, that these ratios have value for comparative purposes. They do indicate or, at least, suggest that divorces are much more frequent among actors than among farmers and rather more frequent among farmers than among farm laborers.

Since the Bulletin was published, I have extended this kind of a comparison to include eight other states, and have ranked the occupations in each state with reference to the ratio of divorces to married males. The states included are Rhode Island, New York, Pennsylvania, West Virginia, Indiana, Illinois, Michigan, and South Dakota. In Rhode Island the statistics of occupations cover 44 per cent. of the total number of divorce cases; in New York, 37.3 per cent.; in Pennsylvania, 52.4 per cent.; in West Virginia, 36.7 per cent.; in Indiana, 33.6 per cent.; in Illinois, 33.9 per cent.; in Michigan, 45.6 per cent.; in South Dakota, 50.8 per cent.

Thus it appears that even in these selected states the returns are far from complete. If it could be assumed that the deficiency was approximately the same in all occupations, the

figures would be as satisfactory as complete returns. But of course no such assumption can safely be made. At the same time, as regards the state of New Jersey, where the distribution by occupation of husband is shown for 81 per cent. of the total number of divorce cases, it seems hardly probable that the corresponding distribution of the remaining 19 per cent. would differ so radically as to destroy the value of the comparison which has been made; and the results for other states are, on the whole, fairly consistent with those for New Jersey.

Assuming, then, that the limitations and defects of the returns are not so serious as to destroy their statistical value for the kind of comparison which I have here made, and in which the emphasis is laid, not upon the ratio, but upon the rank of the several occupations as determined by these ratios, it becomes interesting to study the results.

The popular impression regarding the frequency of divorce among actors here finds confirmation. In the ratio of divorces to married males this occupation or profession leads the list in all but one of the nine states for which the ratios referred to have been computed. (See Table IV.) In that one state (South Dakota) musicians and teachers of music have the first rank, and actors share the second rank with commercial travellers, physicians, and telephone and telegraph operators. It frequently happens that in a given state two or more occupations have the same ratio, and therefore the same rank, although the exact ratio expressed as a fraction or carried out to a sufficient number of decimal places would doubtless show differences. But such differences have not been computed. Musicians and teachers of music, as just stated, have the first rank in South Dakota. In one other state they share the first rank with actors. They rank second in three states, third in another state, and fourth in the one remaining state. On the whole, this occupation appears to be the one which most closely rivals that of actors in the divorce courts.

Commercial travellers have the second divorce rank in four states. In four other states their rank ranges from third to sixth, but in the remaining state, Indiana, they have, for some

reason, an exceptionally low rank, being thirtieth. Perhaps some of you may feel that I ought to say exceptionally high rank, but of course the terms high and low are here used in a purely statistical sense, and imply no moral judgments.

Barbers and hairdressers represent another occupation in which divorce appears to be relatively frequent, the rank of this occupation ranging from third in the state of West Virginia to eleventh in the state of South Dakota.

Bar-tenders have comparatively high divorce rank in six of the nine states, a medium rank in two other states, and in the remaining state, Rhode Island, an exceptionally low rank, being, in fact, thirty-seventh. It is not improbable that an exceptional ranking appearing for a single state reflects some inconsistency in the occupational classification resulting from peculiar or local usages in regard to designation of the occupation. For instance, a bar-tender might be returned and classified as a saloon-keeper.

In most of the states hotel-keepers are well up towards the head of the list as regards divorce, and so are restaurant and saloon keepers.

Having specified those occupational classes which appear to be most addicted to divorce, let us now inquire what occupations represent the other extreme, having what I have rather hesitatingly termed a low rank in this respect. The comparison we are considering distinguishes thirty-nine occupations or occupation groups. In four states, Rhode Island, New York, West Virginia, and Indiana, the thirty-ninth or last place on the list is occupied by farm laborers. In Pennsylvania and Michigan this distinction belongs to miners and quarrymen. In New Jersey stationary engineers and firemen come at the foot of the list. In Illinois clergymen have this position; in South Dakota, farmers.

The range in the ranking of farm laborers is from twenty-third to thirty-ninth in the different states included in our comparison. For blacksmiths the range is from twenty-fifth to thirty-seventh; for carpenters, from twenty-fifth to thirty-sixth; for farmers, from twenty-third to thirty-ninth; for clergymen, from thirty-

third to thirty-ninth. Next to farm laborers, clergymen appear to have the lowest average rank as regards divorce.

The fact just stated regarding the clergy suggests a comparison with the other so-called liberal professions, law, medicine, and teaching. I have already referred to the high rank in the divorce record indicated for physicians. The range extends from the second rank in South Dakota to the eleventh in West Virginia. It is not altogether clear whether the second place among the professions belongs to lawyers or to teachers. Each of the two professions show a rather wide variation in ranking. For lawyers the range extends from the fourteenth rank to the thirty-fifth, for teachers from the sixteenth to the thirty-second. On the whole, however, there appears less divorce among teachers than among lawyers. In two states, New York and Indiana, lawyers and teachers seem to be in the same class with clergymen; but in the other states their divorce rank is considerably higher.

The tables which follow present the data upon which the above discussion relative to occupations is based. Table I gives the number of divorces granted during the twenty years 1887 to 1906, classified according to the occupation of the divorced husband; Table II, the number of married males reported in each of the specified occupations at the census of 1900; Table III, the ratio of divorced husbands to married males in each occupation; and Table IV, the rank of the several occupations as determined by this ratio.

In these tables the attempt has been made to arrange the occupations in the order of the prevailing or most usual rank shown for the nine states included in this comparison. This has been determined partly with reference to the median rank and partly with reference to the portion of the scale where there appeared to be the greatest concentration in the ranking of the given occupation. The order, which was thus determined without applying any mathematical formula, differs slightly from an order determined by the average rank, but is believed to be more typical and representative.

TABLE 1.—DIVORCES GRANTED FROM 1887 TO 1906 INCLUSIVE, CLASSIFIED BY THE REPORTED OCCUPATION OF THE DIVORCED HUSBAND.

OCCUPATION OF HUSBAND.	NUMBER OF DIVORCES: 1887 TO 1906.*						
	Rhode Island.	New York.	New Jersey.	Pennsylvania.	West Virginia.	Indiana.	Illinois.
Total.....	6,953	29,125	7,441	38,696	10,308	60,721	82,209
Actors, professional shoemen, etc.....	35	319	64	187	6	53	472
Musicians and teachers of music.....	28	125	37	103	8	39	198
Commercial travellers.....	40	308	119	335	18	39	365
Telegraph and telephone operators.....	9	51	23	31	7	40	161
Physicians and surgeons.....	41	210	73	341	40	213	440
Barbers and hair-dressers.....	49	142	80	283	28	279	474
Servants and waiters.....	48	149	78	182	21	135	534
Bartenders.....	17	114	59	165	6	106	104
Restaurant and saloon keepers.....	17	244	44	148	18	266	244
Hotel keepers.....	17	146	42	148	13	39	127
Tobacco and cigar factory operatives.....	5	63	35	213	5	40	187
Printers, lithographers, and pressmen.....	19	120	80	151	10	79	90
Book-keepers, clerks, stenographers, etc.....	180	617	464	884	40	394	1,329
Steam railroad employees.....	112	1,140	146	1,000	137	310	1,578
Faulters, glaziers, and varnishers.....	17	67	54	170	6	51	145
Bakers.....	132	1,010	413	3,553	567	5,741	3,316
Laborers (not specified).....	47	285	176	405	23	170	181
Agents.....	31	222	103	222	27	200	130
Salesmen.....	31	98	73	229	7	93	290
Butchers.....	18	114	10	180	10	71	374
Tailors.....	39	162	62	199	4	51	180
Plumbers and gas and steam fitters.....	150	492	188	438	19	259	102
Machinists.....	326	899	472	939	96	539	1,078
Merchants and dealers.....	6	86	37	73	19	71	176
Lawyers.....	33	158	79	144	7	40	265
Bankers, brokers, officials of banks, etc.....	44	59	53	205	32	137	187
Masons (brick and stone).....	26	128	15	158	18	125	185
Boot and shoe makers and repairers.....	32	143	20	208	12	86	313
Watchmen, policemen, firemen, etc.....	48	262	99	282	26	127	389
Manufacturers and officials, etc.....	54	177	45	319	35	249	155
Engineers and firemen (not locomotive).....	118	238	183	502	89	609	345
Carpenters and joiners.....	107	1,264	283	1,893	1,628	5,380	2,837
Farmers, planters, and overseers.....	28	95	41	189	33	230	275
Blacksmiths.....	131	219	144	431	37	287	280
Drymen, hackmen, teamsters, etc.....	8	29	21	64	16	62	59
Clergymen.....	9	93	86	322	9	164	406
Agricultural laborers.....	945	2,092	1,596	4,866	425	2,483	771
All other occupations.....	3,961	18,268	1,407	18,871	6,527	40,349	54,323
Occupation not reported.....							

* In the state of New Jersey the occupation was reported for 81.1 per cent. of the males divorced; in Rhode Island for 44.5 per cent.; in New York, for 37.3 per cent.; in Pennsylvania, for 36.7 per cent.; in West Virginia, for 36.7 per cent.; in Indiana, for 33.6 per cent.; in Illinois, for 33.9 per cent.; in Michigan for 41.6 per cent.; and in South Dakota, for 50.4 per cent.

† Organized from part of Dakota territory, November 2, 1889. Divorces granted in the counties then comprising Dakota territory are distributed between North Dakota and South Dakota according as the counties are now located in one or the other of these states.

TABLE III.—RATIO OF MARRIED MALES IN EACH SPECIFIED OCCUPATION IN 1900 TO HUSBANDS DIVORCED FROM 1887 TO 1906, INCLUSIVE, AND REPORTED * AS HAVING THAT OCCUPATION.

OCCUPATION.	NUMBER OF MARRIED MALES IN 1900 TO EACH HUSBAND DIVORCED FROM 1887 TO 1906, INCLUSIVE.*								
	Rhode Island.	New York.	New Jersey.	Pennsylvania.	West Virginia.	Indiana.	Illinois.	Michigan.	South Dakota.†
Actors, professional showmen, etc.....	2	10	6	4	8	7	3	4	3
Musicians and teachers of music.....	7	40	22	16	23	10	9	6	3
Commercial travellers.....	12	24	9	10	23	22	11	8	3
Telegraph and telephone operators.....	18	46	24	31	32	17	13	8	3
Physicians and surgeons.....	10	40	23	19	26	19	15	12	3
Barbers and hairdressers.....	13	79	33	24	15	12	13	9	5
Servants and waiters.....	62	118	44	33	19	9	10	15	4
Bar-tenders.....	77	65	22	23	35	14	10	12	8
Restaurant and saloon keepers.....	27	45	40	27	26	19	13	13	8
Hotel keepers.....	10	53	37	37	29	24	14	13	9
Tobacco and cigar factory operatives.....	12	163	34	37	60	20	16	13	4
Printers, lithographers, and pressmen.....	23	111	37	40	22	20	66	12	4
Book-keepers, clerks, stenographers, etc.....	17	56	32	44	38	18	17	19	4
Beam railroad employees.....	16	201	53	42	21	20	20	17	7
Painters, glaziers, and varnishers.....	16	139	48	37	51	21	23	16	8
Bakers.....	28	152	48	34	22	21	23	16	8
Laborers (not specified).....	51	180	94	44	24	8	26	16	7
Agents.....	23	132	34	49	32	31	71	22	12
Blacksmiths.....	16	139	48	37	51	21	23	16	8
Butchers.....	16	139	48	37	51	21	23	16	8
Tailors.....	29	334	66	73	25	18	29	22	5
Plumbers and gas and steam fitters.....	21	165	61	54	45	21	22	21	5
Machinists and engineers.....	13	137	48	47	57	33	34	24	6
Merchants and dealers.....	33	100	40	73	49	43	34	23	9
Lawyers.....	38	100	40	73	49	43	34	23	9
Bankers, brokers, officials of banks, etc.....	20	88	52	54	80	77	36	35	11
Masons (brick and stone).....	24	250	82	94	34	24	29	27	16
Teachers and professors in colleges, etc.....	36	140	50	73	52	38	38	18	10
Watchmen, policemen, firemen, etc.....	37	120	83	55	52	31	28	31	18
Manufacturers and officials, etc.....	35	112	82	77	54	52	38	42	7
Mine-owners and firemen (not locomotive).....	102	297	179	115	32	20	43	113	27
Carpenters and joiners.....	32	218	65	83	52	26	37	27	13
Farmers, planters, and overseers.....	34	138	92	89	49	34	34	20	36
Blacksmiths.....	34	164	99	87	81	30	40	24	21
Draymen, hackmen, teamsters, etc.....	24	216	82	97	60	37	53	72	22
Agricultural laborers.....	197	449	113	78	1,021	127	62	23	30

* In the state of New Jersey the occupation was reported for 81.1 per cent.; in Rhode Island, for 44.5 per cent.; in New York, for 37.3 per cent.; in Pennsylvania, for 52.4 per cent.; in West Virginia, for 36.7 per cent.; in Indiana, for 33.9 per cent.; in Illinois, for 45.6 per cent.; and in South Dakota, for 80.8 per cent.

† Organized from part of Dakota territory, November 2, 1889. Divorces granted in the counties then comprising Dakota territory are distributed between North Dakota and South Dakota according as the counties are now located in one or the other of these states.

BETTER STATISTICS OF INDUSTRIAL MORTALITY FOR THE UNITED STATES.

BY CRESSY L. WILBUR.

From the leading editorial in the *Journal of the American Medical Association* for Jan. 9, 1909, on "Industrial Hygiene: A Neglected Field," I quoted the following extract as the basis of an appeal* to the medical profession of the United States to co-operate in securing the more definite statement of specific occupation and industry of decedents as reported upon certificates of death:—

When we turn to our own country, the contrast is striking. We have statistics as to the mortality rate in the different trades, but almost nothing as to the far more important feature, the morbidity rate. In the case of women wage-earners the uselessness of this one-sided information is strikingly shown, for according to the federal statistics women factory workers have a lower death-rate than any other class of society, the truth being, of course, that few women die as factory workers. When death comes, most of them have passed into the class of housewives. Nor do the mortality statistics give really accurate information, because the classification of the trades is not sufficiently discriminating. Thus the men who work at the metal-polishing wheels are listed together with the men in other branches of the metal trades, and therefore the federal figures do not show the enormous death-rate from pulmonary disease among these men which is revealed by an examination of the records of the Metal Polishers' Union. In the older countries not only the death-rate, but the injury to health caused by the trades, is made the special object of study and of government control; and here we American physicians fall far behind our European contemporaries. The physicians of Germany, France, Great Britain, and Switzerland have grown alert to the close connection between occupation and disease.

The mortality of occupations is one of the most difficult problems of vital statistics, especially in the United States where

* Letter in *Journal of the American Medical Association*, Feb. 6, 1909.

only a little over one-half of the population possesses fairly complete registration of deaths at all. The accuracy of figures showing occupational mortality from various causes of death depends upon the completeness and precision of several factors. These are: (1) the correct statement of occupation and age in the enumeration of population by the census; (2) the correct statement of occupation and age of decedents upon certificates of death; and (3) the precise statement of cause of death by the attending physician, health officer, or coroner upon the medical certificate. It is especially important that the mode of statement of occupation and the correct statement of age shall harmonize upon the population schedules and the transcripts of deaths, as otherwise the ratios of occupational mortality which are based upon the comparison of these two sets of returns will be to some extent unsatisfactory.

Much attention is being given to the subject of occupation by the division of population of the census in connection with the preparations for the taking of the Thirteenth Census in 1910. The Census Bill, now in conference, provides for the statement, after "occupation," of "whether or not employer or employee," and it is contemplated to ask the further question of "by whom employed," so that by reference to a list of industrial establishments, it is hoped, the precise nature of the industry as well as the specific character of the occupation of the individual can be established. Furthermore, an analytical study is now being made of the extremely numerous terms returned at the Twelfth Census for the designation of occupations, so that for the first time in this country the material will be available for a thorough classification of occupations. On the basis of this information and of previous experience precise instructions will be formulated for the enumerators of population at the approaching census, and it seems likely that the data relating to the occupations of the inhabitants of the United States who are enumerated in 1910 will be more valuable than ever before collected.

Efforts are likewise being made to secure better reporting of occupations in the mortality returns. At the initial meeting of the Section on Vital Statistics of the American Public Health

Association at Atlantic City, 1907, I submitted, for consideration by the organized registration officials of the country, certain propositions which were printed in the Quarterly Publications of the American Statistical Association for December, 1907, so that they were brought very widely to the attention of statisticians and students of social data, and were also referred in due course to a special Committee on Occupations, of which Mr. Frederick L. Hoffman was chairman. At the second annual meeting of the Section, held at Winnipeg, August, 1908, two of the propositions were adopted, and have now become accepted rules of practice of the registration officials of the United States:—

STATEMENT OF OCCUPATION.

Rule No. 1.—An attempt should be made to secure not only the kind of occupation (*e.g.*, laborer), but also the kind of industry (*e.g.*, pottery).

Rule No. 2.—Occupations should be stated for all decedents over ten years of age (and for decedents under ten years of age if employed in a mill, factory, or in any gainful occupation).

The other propositions are still under consideration by the committee, which will report upon them at the meeting to be held at Richmond, Va., during the present year. At the same time a revised form of the "Standard Certificate of Death" will be adopted, of which the improved statement of occupation will form a part, so that we shall be able to begin the use of the new blank on Jan. 1, 1910, and thus obtain better returns of occupations for the census year. The exact form in which the question is to be asked is still under consideration, that suggested above being only a tentative arrangement designed to elicit discussion. Having agreed upon a standard certificate of death with satisfactory provision for the statement of occupation, then it will be possible for the Bureau of the Census to prepare instructions for the reporting of occupations that will be entirely consistent with the instructions given to enumerators for the return of occupations on the population schedule, and, with the co-operation of the state and city registration services, these instructions can be brought to the attention of every

physician, undertaker, and local registrar in the United States who has to make out the original reports.

Physicians do not, as a rule, in the United States certify to the occupation of the decedent. This information is more usually given by the informant, who may be some relative or friend of the deceased, or by the undertaker. But physicians do occasionally fill out this part of the certificate, and they might readily note, when the certificate is presented for statement of the cause of death, whether the occupation is properly stated or not. In fact, it might be possible to provide for an indorsement by the medical attendant of the statement of occupation, with the addition of such details as may be necessary for proper classification. He could call special attention to the effects of former occupations as determining the cause of death.

But it is doubtful, to my mind, whether physicians as a whole would respond to any great extent to such an opportunity for obtaining additional and very important data on the effects of employment. I am afraid that they would be apt to consider even the simplest addition to the present form of question as unduly complicated and as savoring too much of "red tape" and inquisitiveness into personal particulars. If the physicians would not approve of the attempt to secure more definite and exhaustive information, it is not likely that the other classes of informants, who may not understand the practical uses of the data, will be likely to yield better results. I should therefore be very glad to learn the personal views of as many physicians as possible in all parts of the country with respect to the suggestions made for obtaining a better statement of occupation upon the certificate of death, and to know how fully the medical profession is disposed to co-operate therefor.

What physicians can readily do, without question, is to furnish more precise statements of cause of death, and to use only the accepted medical terms to describe well-known diseases, taking special pains to note that diseases or injuries due to occupations are definitely indicated. Thus "lead poisoning (house painter)" would clearly show that it was not a case of accidental acute poisoning from some salt of lead, but that it

was probably chronic poisoning, and, moreover, occupational, thus definitely assigning its position in the International Classification. The painter may have been compelled to relinquish his proper occupation on account of his illness from the effects of lead, and the occupation given by the informant may have been of quite a different sort. The physician's statement will enable the true connection of occupation and disease to be shown. The means of the injury should always be given in deaths from violence, and a clear statement as to whether the violence was accidental, suicidal, or homicidal. If the injury was connected in a direct way with the decedent's occupation and the occupation is not clearly stated under the head of "personal particulars," then reference to it may be made in the statement of cause of death. For example, the informant may have given the occupation of a certain individual as "laborer." The physician, noting the insufficiency of the statement, may report under cause of death, "Accidental fall down shaft (coal mine)." This will enable a correct compilation to be made.

Mortality statistics of occupations cannot rise above their sources with respect to accuracy, and it would be a mistake to make too elaborate compilations of data for which the original statements were lacking in precision. With the minute subdivisions of occupations sometimes proposed, the number of deaths definitely returned may be too small to give results of value. Thus for copper miners in England, according to the occupational statistics of mortality of the Registrar-General, the comparative mortality figure is at the foot of the list from Bright's disease, suicide, and diseases of liver, while it heads the list for "other diseases of the respiratory system." But there were only 60 deaths of occupied copper miners, and 69 deaths of unoccupied and retired copper miners, for the entire three years, 1900-1902, upon which these figures are based. The total number of distinctive occupations, or groups of occupations, of males concerning which he finds it practicable to present mortality figures, is only about 120, and for females no ratios are given, it being stated that, "although much labor has been devoted to this subject, the attempt to obtain any useful information thereupon has unfortunately proved disappointing."

THE TEACHING OF STATISTICS.*

BY WILLIAM B. BAILEY, PROFESSOR OF STATISTICS, YALE UNIVERSITY.

To the mind of the average undergraduate the word "statistics" represents columns of figures and little else. He knows that these figures play a large rôle in the world about him, and is naturally curious to learn something about them. The graduate student may take advanced work along this line, with a very definite end in view. But the number of such is comparatively small in any university. Most of the statistical courses which are offered in American colleges are elementary in nature, and are elected by students who are somewhat ignorant of the exact nature of the work they are choosing. It is to the instructor of such a course that this paper is presented for consideration and criticism.

Without entering upon a discussion of the place of statistics in a classification of the sciences, and without endeavoring to determine whether it is itself a science or a method, no one will deny that it is a most useful tool for scientific study in several branches of knowledge. The aim of the instructor in statistics should ever be to make the student expert in the use of this tool. This task is by no means so easy as might at first appear.

Since a considerable ability in mathematics is necessary, and a decent knowledge of the fundamental concepts of economics and sociology is desirable, it seems advisable that an elementary course in statistics should not be introduced before the Junior year in college, if satisfactory results are to be obtained. The frequency of recitations will depend upon the schedule adopted in different institutions, but the equivalent of two hours per week throughout the college year is none too much to furnish the necessary training. Since, by the nature of the subject, the class-room work must be intensive and personal, twenty-five

*Paper read at the annual meeting of the American Statistical Association, Atlantic City, Dec. 29, 1908.

men are all who should receive instruction at the same time. If the course is elected by a large number, several divisions should be formed.

In an elementary course a text-book should be selected to serve as a skeleton for the work, and by regular assignments hold the men to their tasks. But it is well to recognize, at the start, that the ability to memorize a column of figures is not the end in view. At a certain period of development a memory test, like the learning of the multiplication table, may be desirable, but the gain in power which should come from training in statistics is very different. The instructor should bear in mind that he is not trying to turn out trained parrots.

At the outset of the course the attention should be directed to the theory of statistics. The class should follow the development of a typical problem, from the gathering of the raw material to the lessons taught by the consideration of the finished product. This will afford opportunity for a description of the different methods employed in collecting data, with the advantages and disadvantages of each one; the various ways in which the material may be tabulated and arranged; the use of the different kinds of averages, the mode, and the median; the meaning of accuracy and error and the proper correlation of two or more quantities. In this connection some time should be devoted to a study of the theory of probability, together with a statement of the usefulness and dangers of conjecture. While any of these topics is under consideration, it is well to give examples to the class, to be either worked out in the classroom or to be computed before the next recitation. Before anything else is done, the problem should be demonstrated and carefully explained to the class. It is indispensable that the fundamentals of theory should be appreciated by all.

In view of the bewildering mass of statistical information which is being poured upon the world at present, it is hopeless to expect that the student will carry much of this in memory. In fact, except to certain trained statisticians, these figures are a means rather than an end. But since every educated man is interested in the economic and social problems of his country,

and may wish, from time to time, to know what light statistics throws upon them, it is important that he should know where to turn for the most reliable information. He should be shown in what public or private publications he could expect to find the most accurate figures upon these subjects. But the fact should not be concealed that in many cases these are, at best, incomplete. It is undoubtedly discouraging to the student to learn the truth with regard to the condition of the vital statistics of this country, but the determination of truth is the end of knowledge, and a more general recognition of the shortcomings of our information upon these subjects may assist to bring the needed reformation. That the students may familiarize themselves with these source books, it is good policy to assign to them the task of bringing to the class-room the latest official statistics upon several subjects in different lines, requiring at the same time a reference to the page and volume which furnished them. This will not only bring the student into touch with reports and volumes, the existence of which is too often unknown, but will accustom him to use figures only when indorsed by a reliable reference.

If it has nothing else to recommend it, the scientific study of statistics should train the critical faculties of the student as well as any subject in the curriculum. There are altogether too many pleaders at present among us who are trying to make the worse appear the better reason, and are resting their argument upon the use or misuse of statistics. There are some writers who make mistakes because they lack proper training. A good course in statistics would preserve such from their errors. There are, unfortunately, others who distort their figures with the intention to deceive. Training in statistics would not save them. Their need is ethical. But a little better appreciation of the value and use of statistics is required by those who are sought as disciples by these perverters. Therefore, instructor and student alike should be continually on the watch for examples of statistical fallacy, and all should be brought to the attention of the class. Unfortunately, they are all too numerous, and often found in high places. The ability to detect a lurking

fallacy and prick the bubble of conceit which accompanies it is perhaps the hardest to develop in the student. And, above all else, each member of the course should be taught to direct to his own work the same searching criticism which he would give to that of another. To train this critical faculty is difficult, for the student has for years looked upon his text-books as the end of wisdom, but at the outset of his active life it is well for him to realize that the world moves, and that what seems true to-day may be proved false to-morrow. This mental attitude may be unsettling, but it is necessary for successful scientific work in any field.

As the extent and variety of the topics which lend themselves to statistical research dawn upon the student, he is likely to overestimate its services, and conclude that statistics can lay a finger upon every sore spot in the social body and point the way for its remedy. It is, therefore, desirable that the limitations of this method of study should be frankly admitted. It is, doubtless, advisable that charitable societies should keep records of the cases which are brought to their attention, that the causes of the unfortunate condition should be tabulated and the results published, that knowledge of the causes may possibly lead to remedial measures. But it is well-nigh impossible to determine with accuracy the primary and contributory causes of poverty. Especially is this the case with those which are caused by the weaknesses of human nature. Statistics of property and income may be gathered with all possible care, but, where there is a financial advantage to be gained by handing in false returns, the accuracy of such tables is problematical. No mistake is made by frankly pointing out the liability to error in such computations.

During the second half-year each student should be engaged upon the preparation of a statistical essay. There is no lack of material for such studies, but the greatest danger is that the student will endeavor to cover too much ground in his paper. He should be shown the advantage of a thorough and intensive treatment of a limited portion of a field rather than a superficial treatment of the whole of it. The material for countless valu-

able studies may be found in our census volumes, the reports of the various departments of the national government, and the vital statistics of certain selected States. In order to stimulate the interest of the men, I have often made use of the class books which are brought out by the secretaries of the different classes of Yale graduates. These appear at irregular intervals, but usually once in five years, following the class reunions. They are a vast storehouse of material for occupational and vital statistical studies. The men are almost always enthusiastic about a subject which deals with their college, and, when a paper of this kind is to be read before the class, the report spreads among the students outside the course, with the result that there are often a number of visitors to hear it. The college publications are always anxious to print papers of this nature. Students should report to the instructor from time to time during the preparation of the paper, to avoid any serious mistakes or omissions, and guard against the ever-present undergraduate temptation of procrastination, and the attempt to crowd into a week the work which should have covered three months. When the paper has been written, the student should be required to draw a chart which will visualize the most important results of the study. To encourage good drawing, I have for the past few years framed and hung in the class-room the most meritorious specimens. This has served as a great stimulus, and the result has been that some remarkably good specimens of work were handed in. The attempt was made to file these charts away, but, when the student had drawn one of which he was particularly proud, he usually wished to send it home. To obviate this difficulty, lantern slides are made of the charts. When the papers are read, these slides are thrown on the screen. There is in this a twofold advantage. The charts all appear of uniform size and large enough to be visible from all parts of the room, and the slides are more easily preserved than would be the originals. After the papers have been read, they are criticised by the class. Near the end of the year a mistake must be very subtle to escape detection. But the class benefits by this criticism, and the later papers

are usually a great advance over the earlier ones. Of course, some of the papers are prepared in a half-hearted and slovenly manner, but most of them are well above the average of undergraduate effort, and some of them have been printed in an economic journal. Work of this grade cannot be obtained from undergraduates by the task system. Knowledge for its own sake may be desirable, but, to persuade a student to do his best, some form of rivalry is necessary. The fear of failure to pass the course may produce a certain standard of work, but this is always low, and the stimulus fails at the point where reasonably good work commences. Unless a higher working motive can be discovered, the spirit of emulation must be encouraged.

When a student has completed a course of this nature, he has gained some idea of the measurement of the social forces, he knows the intensity of various economic and social phenomena in different countries, and he is prepared to get the meaning from columns of correlated figures. He can read critically and detect a fallacy that is not too well masked. But, above all, he has gained power. He realizes that he has done a piece of first-hand statistical work. He may still be somewhat clumsy in the use of his tools, but he knows what they are for, and with sufficient practice he may yet become a finished workman.

TEACHING OF STATISTICS.

DISCUSSION OF PROFESSOR BAILEY'S PAPER.

BY GROVER G. HUEBNER.

Perhaps more than any other subject, statistics as taught in the universities must be closely moulded according to the needs and demands of the student. A line may be drawn, it seems, between a course such as is desired by the student who wishes to become a trained statistician and by him who is being prepared to enter the financial, commercial, or industrial world as a business man. The former wishes to make a business of statistics: the latter wishes to know merely enough about statistics to aid him in his banking, mercantile, insurance, manufacturing or other business or to enable him to better understand the affairs of everyday life.

Of the former kind of student there are, as a rule, but relatively few. There are, occasionally, a few graduate students who desire to enter the government service or who, as investigators, wish instruction in statistics. But there are very few undergraduates in the average university who attend with the idea of entering the government or other service as statisticians. The instructor, with a class of such students, would outline a highly technical course requiring a large amount of work on their part, and, intending ultimately to become statisticians, they would find it interesting and be willing to devote a good share of their time to it.

But such a course would be beyond the average student who, as the son of a broker, banker, insurance man, manufacturer, merchant, or other business man, intends to enter his father's business. To him statistics are but a means of expression. They confront him in many of his affairs, both public and private, and he wishes to know how to interpret them. Much of the highly technical instruction desired by the former class of students must necessarily be omitted or they will get little out of the course. It seems also that it would be wise to open such a class to second-year men, so that they can make use of their training throughout the remaining two and principal years of their college course. No matter what line of study he may be specializing in, a careful study of statistics enables him to better understand the lectures given him by his instructor and the special reports which he is so often required to prepare. The application of a course in statistics to sociology and kindred subjects is generally recognized in colleges, but it may

equally well be applied to many other subjects taught in the large universities of to-day. The study of trade and trade organization involves a constant use of statistics; insurance has its mortality statistics; banking has its bank statements; transportation has its tonnage and mileage statistics; accounting constantly deals with figures. Even an elementary training in the use of figures would be of material aid to the student who is about to specialize in any one of these subjects; and, since he does his specializing in the last two years, it seems advisable that he be permitted to receive some statistical training as a Sophomore.

Various ends may be accomplished in a statistical course such as this, which would be of value to any student willing to do a reasonable amount of earnest work. In the first place the instructor may render an invaluable service merely by driving home to them the spirit of accuracy,—the spirit that statistics are not to be accepted without an understanding of what they actually represent. How were they collected? Exactly what items are included and what items are excluded in a given table or chart? They should see that only in that way can they know whether an apparent tendency shown in a statistical table is real or is merely the result of a change in statistical method.

Frequently the importance of this can be impressed upon them by glaring mistakes made in papers which they are preparing. Unintentional and vital errors may also be pointed out to them on the part of authors who accepted grand totals without examining the separate items. In commercial statistics, for instance, though the government records make clear specifications, writers have confused copper ingots with telegraph wires, tanned leather with boots and shoes, rough lumber with mahogany chairs. Just such errors have been made in nearly every other branch of statistical study. If the instructor succeeds in doing nothing else than instilling this spirit of accuracy, he will be rendering the student an invaluable service.

The second aim would be to acquaint the student with the main statistical tools, such as the mode, the median, the use of averages, the tabulation of statistics so as to present a clear picture, the reduction of highly irregular data to a readable form, the drawing of accurate and readable statistical curves. To the statistician the making of a table is a matter of course; but how many untrained men are there who can tabulate their results into a readable form? One is often confronted by merely a column of figures, and the average reader judiciously avoids them.

A third end is to acquaint the student with the principal statistical sources in some of the main fields of investigation. The meaning of the terms used and the purposes for which the data may or may not be used must be explained to him. This may be done in the case of the sources

of labor statistics, social and vital statistics, commerce, transportation, industry, insurance, and others. If the student is particularly interested in any subject of general interest, it will of course be included, otherwise it may be taken up with him privately.

Lastly, as Professor Bailey has explained, each student should be required to prepare a number of papers. These may be adjusted as much as possible to the chosen field of each individual student. If properly done, he will get more out of this part of his work than out of any number of lectures, no matter how carefully prepared. It is in his class report that he attempts to apply whatever he has heard in the classroom. By preparing his papers under the immediate guidance of the instructor, a student who is not afraid of work may carry away with him something of material aid. It was once my good fortune to attend a university course in statistics under the guidance of a very able statistician, a member of your association, and I have never regretted the hours which I then spent with him.

A college course in statistics, however, may not be regarded as a guarantee of efficiency. Even the kind of instruction sought by the few students who wish to become statisticians or investigators is only a starter. The success of the individual student will depend upon how well he can apply that instruction. Some of them can never become experts. The more general course, moreover, does not seek to produce expert statisticians. It seeks to enable the layman, whether in public life or private business, to better understand the results obtained by the statisticians. To the average layman a table of statistics is like a juggler's wand, the result depending wholly upon the skill and desire of the particular juggler. Even an elementary course in statistics dispels much of this erroneous darkness and mystery, and thereby renders a lasting service both to the layman and to the unbiased statistician.

REVIEWS.

Report on the Desirability of Establishing an Employment Bureau in the City of New York. By Edward T. Devine, General Secretary of the Charity Organization Society of the City of New York. New York Charities Publication Committee, 1909. pp. 238.

In this report Dr. Devine presents the results of an investigation conducted by him as to the desirability of establishing an employment bureau in the city of New York on the plan of Mr. Jacob H. Schiff's memorandum submitted to the Charity Organization Society.

This memorandum proposed, in brief, the organization in the city of New York of an Employment Bureau "under a board of trustees composed of experienced men, preferentially from the mercantile and industrial classes," the Bureau to be placed under a "manager of great executive ability," with two or three assistants "thoroughly conversant with the classes and their peculiarities which compose New York City's working population," and the work of the Bureau to cover all sections of the United States, but its benefits "to accrue primarily to the unemployed of the city of New York."

In the first thirty-four pages of this report Dr. Devine summarizes the results of his investigation. The remainder of the report consists of a series of thirteen appendices, of which the first is a copy of the letter of inquiry sent to about thirty economists, sociologists, and employers who were believed to be in a position to furnish definite information on points immediately pertinent to the report in hand. Appendix II contains, in detail, the replies from the gentlemen addressed. The remaining appendices (III to XIII) are more extended special reports on particular aspects of the inquiry and other material designed to enable the reader to form independent conclusions as to the desirability of an employment bureau of the character outlined above.

In his summary Dr. Devine remarks that "the most striking fact about the replies to these inquiries is the complete demonstration that they give that there is no definite information on these matters, and that the views of those who have evidently considered them most carefully are apt to be diametrically opposed." In expressing his own views, he says: "The conclusion to which I am forced to come from a painstaking examination of all of the data on this subject available in print, and from correspondence and personal conference with those whom I have

thought most competent to advise on the subject, is that there is a need at all times, and in periods of even slight depression a very urgent need, of an efficient system of bringing together as quickly as possible those who are seeking work and those who are seeking workers. . . . I am inclined to think that such an agency would actually increase to an appreciable extent the effective demand for workers." In a later paragraph he adds, "The proposed Employment Bureau would certainly be one means, and . . . probably the best means, of meeting this great and permanent need by mediating between work and workers in that large number of instances for which no other especially appropriate means of communication has been established."

He then considers the work of the commercial employment agencies, the charitable (free) employment bureaus (of which the more notable were the Cooper Union Labor Bureau, the Employment Bureau of the United Hebrew Charities, and the Employment Bureau of the Society of St. Vincent de Paul, each of which has been discontinued), the Division of Information of the Federal Bureau of Immigration, the Labor Bureau of the State Department of Agriculture, want advertisements, the methods of trade union officials in finding employment for members, and the method of leaving the matter of finding employment or workmen to individual responsibility. By none of these agencies does it appear to him that the field has been adequately or systematically covered.

The further regulation of commercial agencies, although admittedly desirable, would not, in Dr. Devine's opinion, "lessen the increasing need for an agency which will be conducted primarily for the good that it will do rather than for the profits that it can earn," nor would the establishment of labor colonies or public relief works be adapted to present needs in New York City.

Dr. Devine's recommendations, while differing in certain respects from the proposition as submitted in Mr. Schiff's memorandum, in all essential features are in harmony therewith.

Three of the appended reports are of somewhat novel character, and are, therefore, especially referred to in this connection. One of these which appears in Appendix VI consists, in part, of the results of an elaborate statistical "Study of Newspaper Advertisements as a Medium for Securing Work and Help," conducted by Mr. H. G. Paine. Appendix VII includes several reports prepared in the Bureau of Social Research of the New York School of Philanthropy under the direction of Dr. R. C. McCrea. Two of these reports by Mr. E. E. Pratt are entitled, respectively, "Trade Unions as Employment Agencies" and "Attitude of Employers toward General Employment Bureau."

In his consideration of free State employment agencies, Dr. Devine says:—

While some of these Bureaus are of course better than others, I regret to report that so far as I can ascertain they are everywhere in politics, and are too perfunctory and inefficient in their methods to become factors in bringing about any real adjustment between work and workers. I have visited one private commercial agency in a western city which has obviously done more work in finding remunerative and permanent, although largely seasonal employment, than all of the Free State Employment Bureaus put together; and it seems actually to have done more free work, *i.e.*, free to employees, than the three branches of the State Employment Bureau in the State in which it is located. It has, moreover, an equipment and system by the side of which the best managed of the State Bureaus makes a sorry showing. Purely for business reasons its statistics are better kept, its information concerning contracts more accurate and reliable, and the interest of its managers and employees in its beneficiaries more in evidence than in the case of the best managed State Bureaus which I had the pleasure to visit. I have no reason to consider that this private agency is greatly superior to others which can be found in New York and elsewhere. The difference is primarily one of efficient administration and of adequacy of compensation for the head of the Bureau. . . . The peculiar relation between organized labor and the State Employment Bureau and the temptation to utilize the Bureau merely to make it appear that the administration of the day is "doing something for labor" are apparently ineradicable obstacles in the way of efficient service. The Municipal Bureaus in Duluth and Seattle appear to be free from the defects of the State Bureaus.

And he adds that "it would be easy to make favorable comment on particular features of certain of the Bureaus, especially those in Massachusetts and Wisconsin."

An opportunity appears to have been afforded in this connection for rendering a real service by an impartial and discriminating judgment upon the work of these offices, which, first established in Ohio in 1890, are now in operation in some sixteen States. But, unfortunately, "it was thought to be desirable to reach a conclusion in time to permit the undertaking of the enterprise [the carrying out of Mr. Schiff's plan] during the present winter [1908-09], if it is decided that it is to be undertaken at all," and that "for this reason the inquiry had to be made in the briefest possible time." The imposition of such restrictions and the obvious obstacles thereby placed in the way of a thorough, painstaking investigation of the subject such as might have been of value, however it may seem to the investigator to have justified the hop-skip-and-jump method of inquiry which was adopted, does not furnish a very adequate basis for comprehensive and unbiased conclusions; and it unfortunately leaves Dr. Devine's reflections upon the free employment offices, and the certificate of extraordinary efficiency given to one unnamed private agency, open to the suspicion that his conclusions may not have been wholly uninfluenced by the thought that it was incumbent upon him to make out a case which would justify the adoption of Mr. Schiff's plan.

But, if there were no conscious bias on Dr. Devine's part in his sweeping indictment of the State free employment offices, should not the admittedly hasty, and therefore superficial, nature of his investigation have prompted him to exercise caution before sending broadcast, under the auspices of the Sage Foundation, such statements as that, "so far as I can ascertain," these offices are "everywhere in politics"?—a charge that, so far as Massachusetts is concerned, we are confident, is entirely without foundation. Reference is also made to what is alleged to be "the peculiar relation between organized labor" and the State employment bureaus and to the temptation to utilize the bureaus "merely to make it appear that the administration of the day is 'doing something for labor,'" which are said to constitute "apparently ineradicable obstacles in the way of efficient service." Here, again, however true this implied indictment of these offices in other States, it cannot be supported by the slightest evidence as regards the Massachusetts offices. There is no such "ineradicable obstacle in the way of efficient service," so far as the Massachusetts offices are concerned and for the reason that no such obstacle exists to be eradicated. That every effort is made by the administration of these offices to treat all applicants for work with absolute impartiality, and that no discrimination is shown union over non-union applicants or vice-versa, Dr. Devine is scarcely competent to dispute, while it is a matter of record that, of the 10,707 individuals for whom the Boston office secured positions in its first year, not more than 441 were known to be trade unionists.

A remarkable discovery, also, is that of the private commercial agency which has "obviously done more work in finding remunerative and permanent, although largely seasonal employment, than all of the Free State Employment Bureaus put together." How "obviously"? No figures or other data are given in support of this assertion, so that, however accurate it may be, its truth is certainly not obvious. In fact, if Dr. Devine or any one else can compile any reliable statistics showing the amount of work done by the State free employment offices of the country, he will render a most important and interesting service. The present writer confesses to having tried it without success, one reason being that the offices in the various States do not keep their statistical records upon a uniform basis. Dr. Devine himself reflects upon the statistical methods of the free employment offices; but does the fact that their records may not be kept with sufficient regard for accuracy quite justify the sweeping assertion that one private agency in a single city has done "more work in finding remunerative and permanent, although largely seasonal, employment [and, we are moved to parenthetically inquire, is employment which is "largely seasonal" to be regarded as synonymous with that which is permanent?] than all of the Free State

Employment Bureaus put together?" These number in the aggregate the country over some thirty-three offices, one of which alone, that in Boston, we know by records believed to be reliable, procured 14,480 positions in the year ending Nov. 30, 1907; 9,941 in 1908; and 5,437 in the first six months of 1909, and of a character both remunerative and permanent as well as undoubtedly "largely seasonal." We should, in all candor, be grateful to Dr. Devine for some statistics of the private agency to which he alludes, and for information as to the method followed in procuring and tabulating the same, together with such totals showing the aggregate work performed by the State offices as he may have used as a basis for his comparisons. Specifications as to the respects in which "the municipal bureaus in Duluth and Seattle appear to be free from the defects of the State Bureaus" would likewise be most interesting. By producing these data, a real service would be rendered those charged with the responsibility of administering the State offices, some of whom, at least, would welcome practical suggestions, based upon experience, from any quarter, public or private, which would promote increased efficiency both in service and in statistical methods.

Dr. Devine's method of assembling and presenting his material is straightforward and concise, and the reader is enabled thereby readily to grasp the nature of the problem considered. It is all the more to be regretted, therefore, that the facts or opinions upon which the compiler's conclusions are based should have been so hastily assembled, and should not have been more maturely digested before being given to the public.

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THE EXTENT OF UNEMPLOYMENT IN THE UNITED STATES.

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A discussion of unemployment necessarily relates only to those persons who are normally engaged in what the census describes as "gainful occupations." The literature on unemployment abounds in attempts, some fortunate, but more calamitous, to accurately limit the field to which the term "unemployed" should apply; but for the purpose of this paper no subtle distinctions will be drawn, nor will any attempt be made to define "unemployed" further than to say that those who are normally engaged in gainful occupations, and who for any reason are temporarily not so engaged, are unemployed. This broad construction of the term is justifiable in view of the fact that such a definition of unemployed forms the basis upon which the available statistics have been gathered.

What is the extent of unemployment in the United States? Much has been spoken and written on this theme; but, so far as the writer has been able to discover, no careful attempt has heretofore been made to compile the available facts and furnish a definite answer to the question. Most of the articles on the subject discuss the causes and effects of unemployment and analyze its remedies; some articles deal with specific cases; but the facts, so far as they exist, are referred to piece-meal or not at all.

This article represents an attempt to present, in a connected manner, the various available figures showing the extent of unemployment. While the writer has sought to point out certain relations between the groups of figures, the broad deductions and generalizations to which they may lend themselves are reserved for other papers and other writers.

The Massachusetts figures are the only available general statistics of unemployment before 1900. They were collected with the data for the Massachusetts censuses of 1885 and 1895, and they cover the regular occupations of those gainfully employed, as well as special or secondary occupations, to which the unemployed may have turned during periods of temporary idleness.

Table I presents a group of Massachusetts figures. The most surprising thing shown by the table is the lengthy period of idleness reported for those unemployed during 1885. For the state at large the average period of idleness is four months. In the individual towns it is slightly less. Equally remarkable is the high percentage of unemployment, which is nearly 30 per cent. for the state at large and twice as much for Fall River, the town showing the highest percentage.

TABLE I.—UNEMPLOYMENT IN MASSACHUSETTS.

Authority.	Date of Figures.	Territory Covered.	Occupations Included.	Total Employees.	Per Cent. Idle.	Average Length of Time Idle.
Mass. Bureau of Labor Statistics.	1885	Massachusetts	All	816,470	29.59	4.11 months
" " " " "	"	Fall River	All	26,220	56.38	3.49 "
" " " " "	"	Lynn	All	21,305	43.13	3.88 "
" " " " "	"	Lowell	All	31,624	33.71	3.61 "
" " " " "	"	Boston	All	169,885	18.40	4.38 "
Massachusetts Census, 1895	1894	Massachusetts	All	925,781	27.27	—
" " " " "	"	Fall River	All	39,856	62.6	—
" " " " "	"	Lynn	All	25,064	30.6	—
" " " " "	"	Lowell	All	37,459	28.3	—
" " " " "	"	Boston	All	193,447	18.2	—

These early figures are valuable, not because of their intrinsic worth, but because they throw the later figures into perspective. They show that unemployment is by no means a new phenom-

enon, as in 1885 it was already an important factor in the typically industrial state of Massachusetts and was particularly noticeable in the industrial towns.

Unemployment since 1900 forms a topic that lends itself to discussion, because since that date considerable material has been collected which bears directly on the problem. In order to present the subject fairly the sources of the material will first be described, and then the material itself will be analyzed.

There are five principal sources of material on unemployment since 1900.

I. The United States Census of 1900 (volume on Occupations) deals at some length with "Unemployment." In 1880 questions on unemployment were asked by census takers, but the answers were not compiled because of lack of funds. The census of 1890 discusses "Unemployment," but very inadequately. In 1900 an attempt was made to treat the question thoroughly. Even in 1900 the figures are regarded as unsatisfactory by the compilers of the census and are described as representing tendencies rather than definite conclusions.

The figures of the census of 1900 are defective in that they do not give the average duration of unemployment for the various trades, but for this purpose classify the unemployed according to the duration of their unemployment. Thus among 5,227,472 males unemployed in all occupations in 1900:—

49.6 per cent. were unemployed 1–3 months.

39.6 per cent. were unemployed 4–6 months.

10.8 per cent. were unemployed 7–12 months.

In short, half of the unemployment is for less than 25 per cent. of the working time, and half of it for more than 25 per cent. of the working time. Thus nearly three millions of working men and boys were unemployed in 1900 for more than one-quarter of the full working time. The census does classify the unemployed by color, nativity, sex, trade, occupation, and state and territory of residence.

II. The Twenty-fourth Annual Report of the United States Commissioner of Labor (1903) is more restricted in scope, but more authoritative in result, than the census. It includes 25,440 families of whose lives a special investigation was made. This investigation was made by experts, while that of the census was made by persons wholly untrained in social investigations. The returns from this work of the Bureau of Labor can therefore be regarded as much more reliable than the census returns.

The 25,440 families selected by the Commissioner of Labor were representative of those gainfully employed in all parts of the country and in all types of employment, and the intensive character of the study makes certain a result of considerable value. The report of the Commissioner does not go into such analytical detail as does the United States Census. The unemployed are classified according to nativity, color, and length of time unemployed; but no attempt is made to classify them by industries.

III. The reports of the New York Bureau of Labor Statistics furnish the most thoroughly compiled, the most ably presented, and the most up-to-date unemployment material available. The Bureau receives reports from the secretaries of as many labor unions as are willing to make the returns, and it is thus enabled to publish, four times a year, a group of facts regarding the employment of about 400,000 labor union members in New York State. The material secured from the labor unions is thoroughly analyzed, and the unemployed are classified by trades, causes of unemployment, months and years unemployed.

The New York figures, coming as they do from union men alone, are not entirely comparable with the census and other figures that are collected irrespective of union membership. There has been considerable discussion as to whether union figures should show a greater or less percentage of unemployment than general figures. On the one hand, it is contended that the unions consist almost exclusively of the skilled workers, who are employed with much greater regularity than the unskilled workers. On the other hand, it is held that many of

the unionized skilled trades, such as glass blowing and building construction, are distinctly seasonal trades, and therefore show a high proportion of unemployment. Then the strikes and stoppages, due to union influence, are responsible for much unemployment. The figures presented in this paper do not furnish any adequate basis for a conclusion as to whether union or non-union workers show the higher percentage of unemployment. All that can be said is that the New York figures cannot be used as strictly corroborative of the figures from other sources.

To make the comparison still more difficult, there is a slight difference in the methods of statement between the New York figures and the United States Census and Commissioner of Labor figures. The New York figures state average unemployment for the year. Thus, if January shows 20 per cent. unemployment and July 10 per cent., the New York method of figuring the unemployment for the year would be to add the 20 per cent. and the 10 per cent. and divide by 2, giving an average unemployment for the year of 15 per cent. In the cases of the Census and the Commissioner's report, however, the unemployment is the total for the year, not the average. Thus in the above illustration, if 20 men in a hundred were unemployed in January and 10 men in a hundred in July, and if the 20 men and the 10 men formed different groups, no member of the group of 20 belonging also to the group of 10, the unemployment would be 30 per cent. for the year. The difference in these two statements is caused by the fact that the New York figures are compiled from the labor union returns,—the question asked is, "What per cent. of your men are unemployed?"—while the census and Commissioner of Labor figures are compiled from individual investigation,—the question asked is, "Were you unemployed?" The resulting difference is apparent. Aside from these slight differences in method the two groups of figures are fairly comparable. It will be noticed, in the succeeding tables, that the percentage of unemployment given by the various authorities is very similar for similar industries and geographical locations.

IV. The United States Geological Survey issues an annual report in which there is a statement of the number of work days and idle days in the coal-mining industry of the United States.

V. The Illinois (annual) Coal Report contains similar material for Illinois. In addition, detailed figures are given for the individual mines. These coal-mine figures give the unemployment not of men but of an industry, and they, therefore, indicate the probable number of days that a miner can go to work if he wishes to, but they do not, like the other figures dealing with unemployment, take into consideration sickness, accident, or any other cause that might keep a man from working. They represent opportunity to work and not work actually performed.

These five authorities, taken as a whole, are by no means satisfactory, but they represent the total available resources of one who seeks to learn the extent of unemployment in the United States, and an attempt will now be made to analyze and compare them. Unemployment in 1900 is shown in Table II. Four of the five authorities cited contribute to this group of figures, but the census figures do not give the length of time unemployed, as was explained in a previous paragraph. It will be noted from the table that unemployment is most severe among the miners. The Census shows that nearly half of them were unemployed at some time during the year, while the figures from Illinois show 126 idle days, and those from the United States Geological Survey show 96 idle days, out of a possible 306 working days,—in each case about a third of the maximum days during which employment is possible. In the lower part of the table a contrast is presented between the census figures and the New York Bureau figures in three specific industries,—printing, tobacco work, and textile work. The census figures cover a much larger number of employees than the New York figures, and in the first two industries show a much higher percentage of unemployment. As previously explained, however, this should be the case because of a difference in method of compilation. When the difference in method is taken into

account, it will appear that the census figures and the New York figures correspond very closely.

Table II shows that, excepting the miners, about one-quarter of those gainfully occupied during 1900 were unemployed. This conclusion is borne out by the census and the New York figures, which show unemployment in "Industry" to the extent of 27 per cent. and 20 per cent. respectively.

The 1902 unemployment figures are presented in order to bring out the relation of the United States Commissioner's report of 1903 to the general problem. This report, as already indicated, is entitled to great consideration, owing to the intensive method of the investigation underlying it. It will be noted that the New York Bureau figures and the coal-mine figures in Table III are almost identical with the same figures in Table II. From this it might fairly be inferred that unemployment was about as extensive in 1902 as in 1900. In view of this stability of unemployment in two cases where comparison is possible and in view of the careful manner in which the United States Commissioner's report was compiled, the unemployment of half of the heads of families coming under the United States Commissioner's investigation is most startling.

TABLE III.—UNEMPLOYMENT IN 1902.

Authority.	Date of Figures.	Territory Covered.	Occupations Included.	Union Members Only?	Total Employees.	Per Cent Idle.	Average Number Days Idle.
18th Annual Report United States Commissioner of Labor	1902	United States	All,—largely Industry	No	24,402	49.81	56½
18th Annual Report United States Commissioner of Labor	1902	New York	All,—largely Industry	No	4,270	56.18	60
" " " " " "	1902	" "	Industry	Yes	300,000	14.3	54
New York Bureau Labor Statistics, 24th Report	1902	" "	Building Trades	Yes	90,817	18.1	—
" " " " " "	1902	" "	Clothing and Textiles	Yes	46,954	22.5	—
" " " " " "	1902	" "	Coal Mining	No	518,197	—	111
United States Geological Survey, 1906	1902	United States	Coal Mining	No	48,005	—	128
Illinois Coal Report, 1907	1902	Illinois	Coal Mining	No	3,530	57.31	59
18th Report United States Commissioner of Labor	1902	Pennsylvania	All,—largely Industry	No	1,604	46.76	69
18th Report United States Commissioner of Labor	1902	Illinois	All,—largely Industry	No	1,604	46.76	69

The United States Commissioner's figures are much higher than the New York Bureau's, showing more than one-half of the heads of families unemployed as compared with 25 per cent. of unemployment in New York. This disparity in returns results from three things: (a) the United States figures include workers in general, the New York figures union members only; (b) the United States figures show total unemployment, the New York figures average unemployment; (c) most of the families studied by the Commissioner had an annual income of less than \$1,000, and a large proportion had an income under \$750. It is generally supposed that unemployment is most prevalent among the lowest paid, and these figures would seem to bear out the supposition.

From the carefully worked out Commissioner's figures it is apparent that among the average group of workers earning less than \$750 the possibilities are that in a normal year one man in every two will be unemployed, and that the unemployment will average 60 days, or one-fifth of the total working time. In a normal year the average wage-earner under \$750, therefore, has one chance in two of losing one-fifth of the working time.

The figures presented for 1900 and 1902 indicate conditions of employment in years of prosperity. More figures were available in 1900 and 1902 than for any other two years, and thus these years were selected for discussion. The figures compiled show that in two prosperous years, in all industries, there is a considerable amount of unemployment. The latest figures, those for 1908, are taken in a year of marked business depression. They are not, therefore, typical, as they represent unemployment in a period of adversity, while the figures for 1900 and 1902 represent unemployment in periods of prosperity.

The figures for 1908 are given in Table IV. Unfortunately no other adequate figures are procurable than those furnished by the New York Bureau of Labor Statistics for the end of March and September of that year.

It will be noted that the March figures show an unemployment in the building trades of 56 per cent., while for all trades the average is 37 per cent. The surprising nature of the Septem-

ber figures will be recognized when it is remembered that the average unemployment for September is ordinarily from 5 per cent. to 6 per cent. The average for September, 1908, is 22.5 per cent. with a maximum of 33.5 per cent. in the building trades. Other trades which ordinarily show a relatively low employment have climbed, in 1908, to a percentage of 20, while two of the trades, even in September, which is a month of great activity, have touched a percentage of 30.

TABLE IV.—UNEMPLOYMENT, NEW YORK STATE,* 1908.

Authority.	Date of Figures.	Occupations Included.	Total Employees.	Per Cent. Idle.
Bulletin 37	End of March	Industry	261,465	35.7
" "	" " "	Building Trades	66,188	56.0
" "	" " "	Clothing and Textiles	23,179	46.7
" "	" " "	Printing	21,719	17.9
" "	" " "	Tobacco Workers	7,212	25.8
" "	" " "	Wood Workers	7,867	31.1
" 39	" " September	Industry	288,181	22.5
" "	" " "	Building Trades	88,009	33.5
" "	" " "	Clothing Trades	22,829	30.4
" "	" " "	Printing	21,547	12.7
" "	" " "	Tobacco Workers	8,250	14.2
" "	" " "	Wood Workers	7,843	21.1

* New York Bureau Labor Statistics, Bulletins 37 and 39.

Tables V and VI show the unemployment in two industries where the greatest amount of data is procurable. These data have been used in the previous tables, but are presented here to show the extent of conformity between the authorities for two specific industries. Both industries have dull and active seasons, and they, therefore, show a higher percentage of unemployment than a non-seasonal industry like printing. It is interesting to note that in both cases the authorities agree closely about the amount of unemployment from year to year. The miner is idle about one-third and the builder about one-fifth of the working days in an ordinary year. The census non-union figures show the total unemployment among certain of the building trades which are unusually seasonal to

TABLE V.—UNEMPLOYMENT IN THE BUILDING TRADES.

Authority.	Date of Figures.	Territory Covered.	Occupations Included.	Union Members Only?	Total Employees.	Per Cent. Idle.	Average Number Days Idle.
24th Report, New York Bureau Labor Statistics.	1897	New York	Building Trades	Yes	47,000	—	75
" " " " " "	1900	New York	Building Trades	Yes	77,344	24	76
" " " " " "	1905	New York	Building Trades	Yes	127,000	15.3	66
United States Census, 1900	1900	United States	Plasterers	No	35,649	56.1	—
" " " " " "	1900	United States	Masons	No	160,638	55.5	—
" " " " " "	1900	United States	Carpenters	No	599,707	41.4	—
Bulletin 37, New York Bureau Labor Statistics	End March, 1908	New York	Building Trades	Yes	66,188	56	—
Bulletin 39, New York Bureau Labor Statistics	End Sept., 1908	New York	Building Trades	Yes	88,009	33.5	—

TABLE VI.—UNEMPLOYMENT AMONG MINERS.

Authority.	Date of Figures.	Territory Covered.	Occupations Included.	Union Members Only?	Total Employees.	Per Cent. Idle.	Average Number Days Idle.
United States Census, 1900	1900	United States	Miners	No	562,417	44.3	—
United States Geological Survey, 1906	1895	United States	Miners	No	382,879	—	113
" " " " " "	1900	United States	Miners	No	448,581	—	96
" " " " " "	1905	United States	Miners	No	626,035	—	96
Illinois Coal Report, 1907	1895	Illinois	Miners	No	38,630	—	125
" " " " " "	1900	Illinois	Miners	No	39,384	—	125
" " " " " "	1905	Illinois	Miners	No	59,230	—	134

be 50 per cent., while the New York union figures show the average unemployment for all building trades to be 20 per cent.

The New York figures will also be given in a way that will show the unemployment in the various trades. "Average" figures convey a good general impression, but they cannot show the real burden of unemployment. An unemployment of 30 per cent. in clothing and 10 per cent. in printing give an average of 20 per cent. of unemployment. This, however, does not in the least degree relieve the burden on the clothing trade. There unemployment is still 30 per cent., although the average is shown to be 20 per cent. If the printers with a low percentage helped to pay the bills of the clothing workers with a high percentage, "average unemployment" would mean something. As, however, each man must stand on his own feet, 30 per cent. unemployment among the clothing trades is for them as serious a matter as if the printers likewise had 30 per cent. The low unemployment in one group does not relieve high unemployment in another group. As average figures are so inadequate, though in most cases necessary, it becomes a matter of considerable moment if the figures for the individual trades can be presented. Selecting a group of trades as compiled in the New York returns, —stationary engines; theatres and music; public employment; food and liquors; restaurants; printing and binding; transportation; tobacco; wood working; metals, machinery, etc.; clothing, textiles; and building trades,—it will be found that there is a marked difference in unemployment between the first three and the last two. Among the first three, unemployment averages from 8 to 10 per cent; among the last two, from 45 to 55 per cent. Six of the trades show an unemployment of less than 25 per cent., while six show more than 25 per cent. The trades showing the greatest unemployment are seasonal (clothing and building); but metals and machinery, wood working and tobacco working, are not seasonal, yet even here the percentage is high. The variation between trades is so marked as to warrant the statement that "average unemployment" gives little idea of the real conditions of unemployment.

TABLE VII.—TOTAL DAYS IDLE: COAL MINES.

Date of Figures.	United States Bituminous.	Pennsylvania Anthracite.	Ohio.	West Virginia.	Alabama.
1890	80	106	—	—	—
1891	83	103	—	—	—
1892	87	108	—	—	—
1893	102	109	—	—	—
1894	135	116	—	—	—
1895	112	110	—	—	—
1896	114	132	—	—	—
1897	110	156	—	—	—
1898	95	154	—	—	—
1899	72	133	—	—	—
1900	72	140	—	—	—
1901	81	110	—	—	—
1902	76	190	—	—	—
1903	81	100	112	96	78
1904	104	106	131	109	90
1905	95	91	130	97	81
1906	93	111	139	86	69
1907	72	86	107	76	64

The figures of unemployment relating to a series of years are procurable from the coal-mine reports and from the reports of the New York Bureau of Labor Statistics. The coal-mine figures are the most extensive, and clearly show the variations in unemployment which occur in the coal-mining industry from year to year. Table VII gives the number of idle days in the mines of the leading coal-producing states and for the country at large. It will be observed that the average number of days of idleness in the anthracite coal mines is 100 per year, while in the bituminous mines it is only about 75 per year. There is, however, considerable variation from year to year. Thus in the anthracite field the range is from 86 in 1907 to 190 in 1902, and in the bituminous field from 72 in 1907 to 135 in 1894. For Ohio, West Virginia, and Alabama the figures go back only to 1903, and are therefore not so satisfactory as the other figures. Nevertheless, they show the same tendency to vary from year to year, although the variation is not so great. In all the figures that extend back so far, the hard years of 1893 and 1897 show clearly the effect of the bad times in the large per-

centage of idleness. Accepting these figures as indicative of general conditions, a coal miner may expect unemployment in every year equivalent to one-fourth or one-third of his working time, and in years of unusual depression unemployment equivalent to five-twelfths to one-half of his total working time.

The New York figures are more significant because they are procurable for the entire year, as well as for two definite periods in the year, March and September. These latter figures are the latest procurable (1908). A comparison of the annual average unemployment in New York State for the years from 1897 to 1906 shows a gradual decrease in the extent of unemployment from 26 per cent. in 1897 to 9 per cent. in 1906, with slight variations above and below the average in some of the years. The unemployment at the end of March, however, which is procurable up to March, 1908, shows a higher percentage of unemployment for March 31, 1908, than in any previous year since the figures were first compiled, unemployment in 1908 being almost 36 per cent., while in 1897, the highest previous record, it was but 30 per cent. The same thing is true of September, that month in 1908 showing 22 per cent. of unemployment as against 13 per cent., the highest previous record, which was attained in 1897, 1898, and 1900.

It is therefore fair to conclude that for the unionized trades of New York State, for the coal industry of the United States, and, by inference, for the general industries of the United States, the following points hold true:—

- A. Unemployment is always a factor in modern industry.
- B. The average miner can work, from year to year, about two-thirds of the time.
- C. In other industries the average unemployment from year to year is about one-fifth.
- D. In some years the unemployment is several times more severe than in others.
- E. 1908 was a year of unusually severe unemployment.

Figures for different portions of the same year are likewise available in the Illinois coal reports and the reports of the

New York Bureau. The Illinois Coal Report relates to coal mines only, and merely gives the percentage of the total coal output which was produced in the different months. These figures do not, therefore, definitely show unemployment, but by inference they show that a greater or less number of days were worked in given months. It is evident that a much greater amount of coal is used in the winter than in the summer months. In Illinois 60 per cent. more coal is mined in January than in July. It is fair to conclude that unemployment is higher in the summer months than in the winter months. There is thus a regular variation from month to month so that a miner may count definitely on a higher proportion of unemployment in the summer than in the winter.

The New York figures are definite and conclusive. They cover accurately nearly 400,000 union men in one state, and they are carefully analyzed by trades.

Figures for the state at large, for seasonal trades (building and clothing), and for one regular trade (printing) are given in Table VIII.

TABLE VIII.—PERCENTAGE OF UNEMPLOYMENT IN NEW YORK IN VARIOUS MONTHS,* 1902 AND 1906.

Months.	All Trades.		Building Trades.		Clothing Trade.		Printing.	
	1902.	1906.	1902.	1906.	1902.	1906.	1902.	1906.
January	20.9	15.0	33.6	14.3	19.2	8.1	12.2	19.6
February	18.7	15.3	34.3	16.4	5.4	12.5	12.9	18.9
March	17.3	11.6	23.5	9.4	21.4	10.2	14.7	18.1
April	15.3	7.3	19.1	6.7	27.6	9.4	13.2	17.0
May	14.0	7.0	13.3	7.6	29.1	10.4	9.2	16.9
June	14.5	6.3	14.1	6.4	28.3	5.3	12.9	16.3
July	15.6	7.6	12.9	10.8	34.3	5.2	13.6	15.8
August	7.1	5.8	7.6	6.9	3.9	3.5	12.8	15.7
September	6.3	6.3	5.1	6.4	6.6	8.0	12.3	15.5
October	11.2	6.9	14.2	7.3	18.1	9.4	10.9	15.8
November	14.3	7.6	13.4	10.2	36.9	8.4	11.0	14.4
December	22.2	15.4	25.6	19.2	39.5	11.5	12.6	13.2

* Twenty-fourth Annual Report New York Bureau Labor Statistics.

For all trades the amount of unemployment in August and September is very low, while for December and January it is two or three times as extensive. This is even more strikingly true of the building trades which are largely dependent upon weather conditions. Both of these instances are the reverse of conditions in the mining industry, where the greatest activity occurs during the winter. The clothing trades show similar contrasts between activity and inactivity; but their activity comes in two periods each year instead of in one period, as is the case in most seasonal trades. The contrast between these seasonal trades, with their marked variation from month to month, and the printing trade, with its marked stability throughout the year, is striking.

From these facts may be drawn several conclusions regarding the variations in unemployment from one part of the year to another.

A. Unemployment in some trades is several times as great in winter as it is in summer.

B. Unemployment is far less common in summer than in winter. (Coal mining, theatres, and clothing work form an exception to this rule.)

C. Some trades in ordinarily prosperous years show an average unemployment of more than 30 per cent. during the winter months.

From the foregoing figures certain conclusions may be drawn regarding the average extent of unemployment.

From occupation to occupation there is considerable variation in unemployment. While unemployment is a factor common to all occupations, there are some, such as coal mining, building, and clothing work, in which unemployment plays a far more important part than it does in others, such as printing. And, while averages mean very little, the average wage-earner in an average year may look forward to one chance in four or five of being unemployed.

There is also considerable change in unemployment from year to year. The New York statistics and the mine statistics are the only ones that furnish data on unemployment over a series

of years. From these it is clear that the average for prosperous times is no index of conditions over a long period of years. While unemployment fluctuates somewhat from year to year, these fluctuations are slight compared with the all-prevalent unemployment of years of depression. In a year of depression in some occupations more than half of the workers are unemployed at one time, and a canvass of total unemployment for the entire year would doubtless run the figure up to 65 per cent. or even to 75 per cent. in these occupations.

Unemployment also varies from season to season. There are certain trades that are seasonal in their nature. They may depend upon the weather, like the building trades, or they may be regulated by trade demands, like the clothing trade, with its spring and fall styles. In these trades the probabilities of unemployment during some period of the year are always high, even in the most prosperous years, while in years of depression the trades are practically submerged at the dull season, unemployment being the rule rather than the exception.

Briefly summarized, it may be said that unemployment is inseparable from the present system of industry: (1) industrial depressions mean extensive unemployment; (2) certain trades are subject to violent fluctuations of demand which result in unemployment; (3) other trades depend on the weather, and, therefore, result in unemployment.

Individual incapacity in the form of sickness, accident, inefficiency, or some other purely personal factor also means unemployment. Taken together, these two things, industrial uncertainty and personal incapacity, make unemployment a constant factor in the life of the average wage-worker.

CALIFORNIA VITAL STATISTICS.

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For the first time in the history of the State, California possesses vital statistics of real utility.* This result has been achieved only after a series of more or less fruitless experiments, covering a period of nearly fifty years, and bearing a marked resemblance, in some details and in general maladroitness, to the registration experiments of a number of other States. For this reason, rather than for any unique features, California's experience may be worth relating.†

Accurate death records would have been of more than ordinary utility for legal purposes in the early years of California's statehood, for the lack of known antecedents in the case of many of the early fortune-seekers frequently led to difficulties in the settlement of estates.‡ Taking advantage of this situation, an enterprising journalist succeeded in getting a registration law enacted in 1858,§ and was appointed State Registrar. Marriages were to be reported by those performing them, births by parents, divorces by those obtaining them, and deaths by sextons. In each case a fee of fifty cents was to accompany the report, which was to be made to the County Recorder. One-third of the income from fees was to be retained by the recorders, one-third was to go to the State Registrar, while the other third was to form a "registration fund" in the State treasury, from which the registrar's salary and the expenses

* Nineteenth Biennial Report of the State Board of Health of California, Sacramento, 1906; Twentieth Biennial Report, 1908.

† The successive Biennial Reports of the State Board of Health have been used as the main sources of information.

‡ Governor's Message of January, 1857, Senate Journal, Eighth Session, p. 43.

§ Statutes of 1858, Ch. 356.

of his office were to be paid. No mechanism was provided for the enforcement of the law, and but few reports were received. The registrar was convinced by two years' experience that his venture was not a lucrative one, and in 1860 the law was repealed, in accordance with his own recommendation.*

The State's second registration law came into being under better auspices. Massachusetts had established the first State Board of Health in 1869, and its example was followed by California in 1870.† The statute establishing the California board did not provide for a registration system, but directed the board to "devise some scheme whereby medical and vital statistics of sanitary value may be obtained." Accordingly, a system of voluntary reports was improvised, circulars and blanks being sent to local officials, physicians, hospitals, public institutions, and even to the various lodges of one fraternal order. The results were, of course, unsatisfactory, and the labor involved was disproportionately great. The board also prepared the draft of a registration act and recommended its enactment.

The plan proposed by the board did not become law, for a code commission was at work on the California statutes. A registration system was one of many features which California borrowed at this time from the laws of New York. By the provisions of the new code,‡ which went into effect in 1873, registers of marriages were to be kept by all persons performing marriages; registers of births, by physicians and midwives; of deaths, by physicians; of funerals, inquests, and burials, by clergymen, coroners, and sextons. Reports were to be made quarterly to the County Recorder. This law seems to have been satisfactory to the State Board of Health, but the returns proved to be too inadequate to be worth printing. The fault was

* The First and Second Annual Reports of the State Registrar of California (1858 and 1859) are among the curiosities of statistical literature. On account of its obvious pecuniary purpose the law was severely criticised by the California newspapers of the day. Nevertheless, at the end of the first year the registration fee was doubled, and the appointment of administrators of estates was added to the facts to be recorded. (Statutes of 1859, Ch. 119.)

† Statutes of 1869-70, Ch. 228.

‡ Political Code of California, 1872, Title vii, Ch. 3.

easily imputed to the "ignorance and apathy of the public." Here, as so frequently in American experience, it was not realized that mere legislative *fiat* will accomplish little, unless it is accompanied by an efficient and centralized administrative system. In default of registration statistics the State Board of Health continued to utilize the reports of mortality in certain localities* obtained from voluntary correspondents,—physicians and, in a few cases, local boards of health. Having tried unsuccessfully to get the registration law amended, the Secretary of the State Board of Health showed a pardonable loss of enthusiasm by recommending that the whole administration of the law, together with the clerical work of tabulation, be shifted to the office of the Secretary of State.†

The registration of births was much less complete even than the registration of deaths. In 1880 the experiment was tried in Sacramento of taking a census of births in connection with the annual school census, and in 1881 it was extended to other parts of the State. Although the results were thought at the time to justify a further development of this system, it is, on the whole, fortunate that no more attempts were made to utilize a method so thoroughly discredited by the experience of the federal census and of several States.‡

In the mean while it was seen that the efficient supervision

* These were at first published monthly in the *Pacific Medical and Surgical Journal*, later in bi-monthly and then in monthly circulars issued by the board. The monthly circulars were reprinted in the Biennial Reports from 1878 to 1902. Annual tables, with classification by sex, age, locality, month, and cause of death, were printed in the Biennial Reports up to 1896. For the years 1892–96 registration records are used in the annual tables in place of the local reports. In general, these statistics are altogether too incomplete to be of use to the investigator, although they throw some light on the relative prominence of certain causes of death.

† The Secretary of State, it seems, would have been in a better position to furnish the proper blanks and record books to those expected to keep registers. An amendment to the registration law, however (Amendments to the Codes, 1877–78, Ch. 239), provided for the distribution of blank registers by the Secretary of the State Board of Health. This change was found to bring little improvement in the operation of the law. An attempt to elicit more thorough co-operation on the part of the County Recorders, by fees paid from the county funds, encountered difficulties in the fact that most of the recorders were limited by law to fixed salaries.

‡ Although some such method may be useful as a means of checking the results of a fairly adequate system of registration of births. Cf. the description of the Michigan system by W. F. Petrie, in the *Quarterly Publications of the American Statistical Association*, vol. x, p. 508.

of registration and sanitation by a State Board with only advisory powers depended almost entirely upon securing the co-operation of local authorities. Local boards of health, it was thought, might co-operate with the State Board in extending and improving the reports of mortality in different localities, in enforcing the registration laws, and in the general furtherance of public hygiene. Local authorities already had the power to follow the example of San Francisco and Sacramento in establishing boards of health.* It was now made their "duty" to do so.† Although fifteen new boards were at once established, the State Board found many of these inclined to "regard themselves as purely local, forgetting that they are parts of a system." It was found, too, that the establishment of a local board of health did not necessarily mean the establishment of an efficient local registration system. In 1882 the State Board reported that many towns and cities had not established registration systems, while of those that had only six required burial permits.

Bills intended to remedy these and other defects of the sanitary code were presented to the legislature in 1887, when they failed to pass, and again in 1889, when a number of important amendments were secured.‡ Interments were forbidden except on permits issued by authorized persons; county authorities were required to establish boards of health or appoint health officers in unincorporated towns; district attorneys could be called upon to prosecute municipal or county officials for failure to appoint boards of health or health officers; and wilful refusal to comply with the burial permit or registration laws was made a penal offence, punishable by imprisonment or

* Political Code of 1872, Sect. 3061. Local boards of health were established by State law in San Francisco and Sacramento prior to the organization of the State Board (Statutes of 1869-70, Chs. 346, 490). Mortality statistics for San Francisco date from 1865, when the local Board of Supervisors established a Health Office, made burial permits mandatory, and required the registration of deaths. (See Report of the Health Officer of San Francisco, 1866.)

† Statutes of 1877-78, Ch. 35. This statute also required the local boards to report all deaths monthly to the State Board, the duplicate registration system being thus recognized by law.

‡ Statutes of 1899, Chs. 26, 29, 38.

a maximum fine of \$1,000. For three successive sessions, bills providing for the payment of fees from the county funds to persons required to keep registers were introduced in the legislature, but for some reason none of these became law.

As an immediate outcome of this legislation the number of local boards of health and health officers rose to over one hundred in 1890, and it appeared that substantial progress was being made toward the development of a fairly adequate registration of deaths. But political changes in 1891 brought about changes in the *personnel* of the State Board of Health. New functions, moreover, had been developed for that body, so that it seems to have battled less strenuously than in earlier years for the cause of vital statistics. At least the enforcement of the law seems to have been left entirely in the hands of local authorities. The operation of the new statutes, however, enabled the board in 1892 to base its "annual tables of deaths," for the first time, on the reports received from the county recorders. The law requiring the registration of births and marriages was virtually inoperative. Mortality returns were received from only about half of the counties in the State, and their publication was wisely discontinued in 1896.*

For over thirty years, then, the California registration system was thoroughly inadequate in principle and in operation. The introduction of new and better laws cannot be credited to any independent development of interest and knowledge within the State: it is to be attributed rather to the well-directed and well-organized efforts of the Division of Vital Statistics of the Bureau of the Census to extend the registration area. California now has a "standard" law† similar in most respects to laws enacted in a number of other States in recent years. "Standard certificates" of deaths (obtained under the burial permit system) are transmitted to the State Registrar through the local registrars of deaths (County Recorders, City Clerks, and Health Officers). Certificates of births and marriages are transmitted

* Save for a perfunctory résumé for the period 1899-1904 in the Eighteenth Biennial Report, p. 24.

† Statutes of 1905, Chs. 110, 119, 346; Statutes of 1907, Ch. 236.

through the County Recorders and the Health Officers of cities organized under "freeholders' charters." Small fees are paid to the local registrars from the public funds.* In the opinion of the State Statistician the reports of deaths and marriages obtained under the new law are fairly complete; but this cannot be said of the registration of births. The Secretary of the State Board of Health is *ex officio* State Registrar, but the law provides for a "Statistician," who has actual charge of the compilation and tabulation of the returns. This office was filled by the appointment of Mr. George D. Leslie, a trained and thoroughly competent statistician.

The new California reports do more than present useful information: they present it in a useful and illuminating way. In this respect they must be ranked among the very best State reports. The tables are accompanied by an adequate explanatory text, in which the more elementary showings of the tables and the inferences that may be made from them are stated with all needed caution. Special emphasis is wisely placed on comparisons and rankings of different localities and regions.

But the real test of reports such as these is, after all, the selection and form of the tables presented. In general, although lack of a sufficient clerical staff enforced rigid economy in this regard, care has been taken to present what most users of such statistics will regard as the more important classifications. The use of tables for the "main and minor geographic divisions" of the State is especially commendable in the case of a State covering so large an area and containing so many distinct physiographic regions as California. It is to be hoped that in future reports the number of general tables can be increased. Marriages ought to be classified by the age of the contracting parties. Births ought to be classified according to the ages of the parents, the duration of marriages, and the number of children previously born of the same mother. This information

* In addition to the officials named, sub-registrars of deaths may be appointed by the County Recorder to receive certificates and issue permits at points remote from the county seat.

is especially desirable in view of the fact that the birth rate is probably lower in California than in any other State.*

In estimating the value of the tabulations of death statistics printed in a State report, it should be remembered that the State report is, or ought to be, part of a national system, including municipal, State, and federal reports. Co-operation between these different branches of our statistical service should not stop with the use of a uniform classification of causes of death. There would be a gain all around if the State reports should show the deaths from each important cause and each class of causes in each "region," county, and city in the respective States, and if the federal reports should develop much farther than at present the classification of deaths by causes and groups of causes in connection with the fundamental facts of sex, age, race, marital condition, rural or urban residence, and occupation. Of course there cannot be an absolute line of division between the work of the two jurisdictions. State registrars should give due attention to the effect of racial differences, for example, while upon the federal office there devolves the duty of making regional comparisons and studies on a broad scale. But the State registration office finds its primary duty (aside from the legal significance of its records) in its relation to the progress of the State and its subdivisions in matters of public hygiene. If this is true, there is thrown upon the federal bureau, as residual claimant, the special duty of contributing to our knowledge of those fundamental social and economic problems upon which mortality statistics throw light. As things now stand, one must sometimes go to the federal reports to ascertain the mortality from a particular disease in a particular locality, and must seek some of the materials upon which important generalizations may be based in the frequently incongruous tables of different State and municipal reports, or, more often, do without them altogether.

* Cf. *Quarterly Publications of the American Statistical Association*, vol. ix, p. 286.

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NOTES.

SECOND DECENNIAL REVISION OF THE INTERNATIONAL CLASSIFICATION OF CAUSES OF DEATH, PARIS, JULY 1-3, 1909.

The classification of causes of death is fundamental in the preparation of uniform and comparable tables of mortality. Many years ago, in the old International Statistical Congress, the attempt was made to formulate a classification of diseases that could be accepted generally throughout the world. For various reasons the effort was not successful, and up to within a comparatively recent period every nation, and in the United States nearly every State and city, had its own peculiar way of compiling statistics of causes of death. No one could be certain, on examining a statistical table of this kind, that the mortality from any disease was fully comparable with the data found in any other report.

The beginning of the solution of this problem may be found in the Proceedings of the International Statistical Institute at Chicago in 1893, when Dr. Jacques Bertillon, as reporter of a special committee of the Institute, submitted the system which has now become recognized throughout the world as the International Classification of Causes of Death. The recommendations of the committee for the adoption of this classification were not generally followed at first, and it seemed probable that the effort would meet the fate of many previous attempts at international uniformity. The turning-point, from which may be dated the ultimate success of this classification, came with its formal adoption by the American Public Health Association at Ottawa in 1898, this action covering recommendations for its practical use in the national, state, provincial, and city reports of the United States, Canada, and Mexico. The report of the committee of the association which recommended this action, and of which Dr. Cressy L. Wilbur, now Chief Statistician of the Census, was chairman, also suggested a revision of the classification then known as the Bertillon System, so that it would be in acceptable form for the census of 1900 and subsequent years, and provided also for a regular decennial revision, in order that the classification might be kept abreast of the progress of medical science.

These recommendations were approved by the International Statistical Institute. It may be noted, incidentally, that, according to a compilation of all of the recommendations made by the International Statistical

Institute since its foundation, the action relative to the International Classification has been the most completely and successfully carried out in practical statistics. The French government called the First International Commission at Paris in 1900, and the International Classification as revised by it has been used by the United States Census Office, all registration States, and nearly all registration cities in this country, since that date. Unfortunately, however, the registration officials and medical men who had contributed so largely to the adoption of the International Classification were not represented in the First Commission of Revision, and, as a result, some cities have failed to adopt the system and many offices have made modifications which have interfered more or less with perfect comparability.

In order to avoid this unfortunate condition and to secure full representation of the important interests practically engaged in the compilation and study of statistics of causes of death, it was planned early by the Bureau of the Census to include representatives of the organized registration officials of the United States and of the medical profession, whose co-operation in the reporting of causes of death is absolutely necessary for successful results. It is very gratifying, therefore, that Congress provided that the Director of the Census should appoint three commissioners to represent the United States in the Second Decennial Revision called by the government of France to meet at Paris, July 1 to 3, 1909, one to be chosen from the Census Office, one from the medical profession, and one from the organized registration officials of the United States. In accordance with this law, Hon. E. Dana Durand, Director of the Census, designated Dr. Cressy L. Wilbur, Chief Statistician for Vital Statistics of the Census Office, Dr. Frank P. Foster, chairman of the Committee on Nomenclature and Classification of Diseases of the American Medical Association, and Dr. Wilmer R. Batt, chairman of the Committee on Classification of Causes of Death of the Section on Vital Statistics of the American Public Health Association, as the Census Commission. At the last moment Dr. Foster was unable to sail, but Drs. Wilbur and Batt proceeded to Paris, and there were also present as official delegates of the United States Dr. Frank L. Pleadwell, surgeon United States Navy, Dr. H. D. Geddings, assistant surgeon-general United States Public Health and Marine-Hospital Service, Professor Walter F. Willcox, Cornell University, and Dr. William H. Guilfooy, registrar of records, city of Greater New York.

The meetings of the commission were held in the Ministry of the Interior, delegates from twenty-three countries being in attendance. A large amount of preliminary work had been done in other countries, as well as in the United States,* in the preparation and submission of suggestions which were printed for the use of the International Commission,

* See *Mortality Statistics*, 1907, p. 16.

constituting a pamphlet of 130 pages.* The meetings were harmonious, and a commendable spirit was manifested by those in attendance in the matter of subordinating the individual preferences of each country to the general good. It was recognized that international uniformity could be attained in this way only. A considerable number of American recommendations were approved, notably that providing for a rearrangement of deaths from violent causes, which will aid greatly in the proper presentation of the statistics of this important class of deaths.

The detailed results of the revision will be printed (*Procès verbaux*), and the revised version will be available, therefore, for the use of the United States Census, and all State and city registration officials, beginning with the year 1910. The opportunity of thus starting out with the mortality statistics relating to the actual census year, which affords the data of population with which the mortality statistics must be compared, is of the greatest value, and it is highly gratifying that the wishes of the United States for the advancement of the date of the International Revision from 1910 to 1909 were acceded to by the French government and the other countries participating.

In accordance with a resolution of the International Commission an official version of the titles is to be prepared in each language represented. The English translation is to be prepared by Dr. Wilbur, aided by the other American delegates and Hon. G. W. Knibbs, Commonwealth Statistician of Australia. This will provide precisely the same tabular list for all English-speaking countries that have adopted the International Classification.

The active interest of the United States in the promotion of international uniformity was accorded a very graceful recognition in the bestowing of the vice-presidency of the International Commission upon Dr. Wilbur, who was called upon to preside over one of the sessions.

The sessions closed on July 3, and on July 4 the delegates were received by the President of France and Mme. Fallières. They also participated in the sessions of the International Statistical Institute, which were held in the week following those of the Commission of Revision.

The next revision will be called in 1919 and under the auspices of the French government, unless other provision is made. It is to be hoped, however, in view of the great advancement of American vital statistics and the important part that this country has played in the extension of the International Classification, that the Third Decennial Revision will be called by the American government to meet at Washington.

C. W. D.

* Exposé sommaire des observations présentées par diverses autorités statistiques à la Commission Internationale chargée de la révision décennale de la Nomenclature Internationale des Maladies. Deuxième session, 1909.

THE NEED OF STATISTICS OF AREA IN THE UNITED STATES.

The writer recently undertook a simple statistical study of population density in the rural districts of the State of Ohio. He was very much surprised to find that, while population figures for townships and "incorporated places" were, of course, available in the United States Census Reports, there were nowhere in the State any official statistics of the areas of these local units. Even in Cuyahoga County; which contains the metropolis of the State, the county surveyor had only recently obtained the data of township areas. He had done this by measuring with a planimeter the surveyed maps of the county. Taking a hint from this method, the writer got his own data for the larger part of the State by measuring on a map and reducing to square miles those townships rectangular enough to admit of it. Of course, the results were crude, the measurements being inaccurate beyond a quarter-mile.

Becoming interested in knowing in how many States of the Union this lack of data existed, he sent a letter to each of the forty-eight secretaries of state, asking whether "there was any compilation, printed or unprinted, of (a) figures giving the total area of each township in the state (or of other similar division smaller than a county) (b) figures giving the area of each town and city."

To these forty-eight letters thirty-nine replies were received. One State, Rhode Island, sent the figures desired, which covered, of course, a rather small proportion of the whole country's area. The answer of the other thirty-eight was that they knew of no such compilation, official or unofficial. In about twenty-cases the question was referred to some other department of the State government or to some Federal Bureau.

One State surveyor said that he had long had such a work in mind, and hoped soon to get at it. Iowa offered to compile the data for thirty-five dollars. In three cases the writer was referred to the United States Department of the Interior, whose lack had already been revealed when Ohio was investigated.

Professor Walter F. Willcox, of Cornell University, has gathered these data for New York State by the planimeter and map method mentioned above. But, as he did this as a purely private enterprise, it has not been included in this account of the status of public statistics of the subject.

This reveals again our woful lack in the United States of many of the most easily obtained and most elementary social statistics. It is exceedingly important, especially since we are coming rapidly to the end of our great free lands, that we should know more and more about the

quantitative relation of the population, particularly of the rural population, to the soil.

The United States Census, it is true, takes up the question of population density, but in a rather general, extensive way. Any intensive study is impossible to one not having access to the complete data of the Census Bureau. If, however, we had the area of every township, parish, hamlet, village, town, and city, it would be easy for any statistician to take up this problem. The only reason for choosing these subdivisions (township, etc.) is that they are the "enumeration units" of the Federal Census.

The purpose, then, of this brief article is to suggest to those interested in statistical studies the need of this particular kind of data, and to urge that a concerted effort be made to have these figures of area obtained by the Thirteenth Census. It would not be an expensive item for the census, though decidedly too expensive for private enterprise.

C. E. GEHLKE.

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INDUSTRIAL ACCIDENTS AND INDUSTRIAL DISEASES.

BY FREDERICK L. HOFFMAN.

Social responsibility for the physical condition of labor is a new conception in political science and one of the most modern as well as difficult functions of government. The idea itself has been evolved out of a vast amount of human suffering and social distress resulting from crude methods of industry and ill-defined relations of employers and employees. The common-law doctrine of the complete assumption of industrial risk by the workmen employed in more or less dangerous trades, excepting gross negligence on the part of the employer, is no longer tenable, and gradually a policy of *labor protection* is being perfected, which, in addition to a more or less clearly defined employers' liability, includes community responsibility for the social consequences of industrial accidents and industrial diseases.

The principle of social justice which shifts the trade risk upon the trade itself and makes it a part of the cost of production is fully justified by both ethical and economic considerations. The modern state is chiefly industrial, for even agriculture tends more and more to become an organized and intelligently co-ordinated branch of industry. Under the modern industrial system, labor efficiency is a factor of first importance, and this implies a maximum of disease resistance, physical

strength, and a long trade life free from serious interruptions caused by preventable illness.

Labor efficiency is but slowly acquired, and its conservation is as much a matter of national concern as the conservation of natural resources. Industry to-day is recognized as a branch of social conduct, and, in the words of Hobson, "society will insist, in proportion as it comes to realize its own good, that the industrial system shall in its structure and working be brought into conformity with the wider material and moral conditions of social growth." Just as the waste of natural resources will not always continue to be tolerated as a rightful exercise of reckless private enterprise, so the waste of human life, health, strength, and ability in industrial undertakings will be reduced to a minimum by effective social regulation and the strict enforcement of rational statutory requirements. The principle as laid down by Hobson in his "Industrial System," is that "the human worth of any given stock of material or immaterial wealth must evidently vary, and vary indefinitely according to the good or bad conditions of its production, according to the good or bad conditions of its consumption. Where it is made by vigorous workers, on short hours under good hygienic and technical conditions, it will involve a minimum of painful or distasteful effort, human disutility; where it is made by feeble women or children working long hours in some insanitary workshop or home, it will involve a maximum of this disutility."

There is, therefore, economic as well as ethical justification for a deliberate state policy of labor protection, and such a policy resolves itself, in its final analysis, into a complete theory of social insurance, conditioned, however, by rational state control of the methods and conditions under which industrial activity shall be permitted to be carried on. It does not follow in practice that the government itself needs to undertake the solution of social and economic problems by perfected methods in insurance, but rather that government insurance is the final alternative of a complete solution of the question of social and labor security unless the end can be achieved by other means.

At this time, however, it is rather a question of actual condi-

tions than of final solutions. The facts which must ultimately govern a constructive policy of reform in the conditions injurious to life and health in industry are but imperfectly known and but imperfectly understood. There is, on the one hand, the unfortunate tendency towards undue exaggeration, and, on the other the equally lamentable attitude of stolid indifference. It is unjust to those who are responsible for the conduct of modern industry to speak of the "carnage of peace," and to draw the unwarranted inference that even a modern war is less disastrous in its consequences as measured by the loss of life and health than the normal conduct of modern industrial enterprise.

The striking comparisons which are often made to establish this absurd contention rest upon a deliberate misuse of statistics, which cannot be too severely condemned, as a deliberate attempt to lead the public astray. Thus, one statement is to the effect that "in New York City alone about 3,500 people variously employed come to a violent end every year, or more than nine a day." This statement practically includes *all* the accidents among adults in the city of New York, but it is evident that a very large proportion of these accidents are not in any manner whatever chargeable to industry or employment. The same writer states that, according to the census report on the mortality in 1906, there occurred "100,000 violent deaths that year," when, as a matter of fact, only 49,552 such deaths were actually recorded, but this number includes all ages and both sexes, and there is no information whatever contained in the report to show what proportion of the deaths were the result of industrial activity.

Statements of this kind are very common. They are widely quoted, and lead to totally erroneous inferences, reflected in radical laws and burdensome industrial regulations which are of more hindrance than help to the cause of industrial reform. As a matter of fact, the total yearly number of fatal accidents in the United States among occupied males aged fifteen and over is approximately 30,000, and, if all possible reasonable allowance is made for defects in death registration, the probable

number does not exceed 35,000.* At most about one-half, and probably less, represent fatal industrial accidents in the strict sense of the term, or such accidents as occur in connection with occupational activity or in consequence of the employments followed. Of this mortality a considerable proportion is, no doubt, the result of personal negligence and indifference, which the most stringent rules and regulations can only very slowly do away with. Workingmen will often needlessly expose themselves to danger, and they are equally careless and indifferent in exposing their fellow-workmen to serious risk. This is not, however, a condition peculiar to this country, but is common to all countries where the industrial system has been developed to a high degree of efficiency.

Of the 15,000 deaths per annum which are the probable result of industrial activity, a considerable proportion results from risks which, in all probability, can never be entirely eliminated. Certain dangers are inherent in trades and occupations and can only be done away with by prohibiting such industrial processes entirely. The mining of coal, the running of trains, the making of explosives, the sailing of ships, all involve natural and inherent dangers which the wisest policy and the most careful precaution can minimize, but not eliminate. The occupation accident mortality in such trades is the price of life itself, for these occupations or employments minister to the absolute needs of the people.

The facts as such require no exaggeration to emphasize the seriousness of the situation and the lamentable consequences which fall upon those who are practically helpless under the present state of affairs. Accidents are more common in most of our industries than in the industries abroad, partly because of the higher pressure under which our work is carried on and partly because of the rapid introduction of a new element of labor unfamiliar with our methods of mechanical production, but largely because of our general attitude of indifference toward human life itself. In coal mining alone there are lost

* Bulletin No. 78 of the United States Bureau of Labor, September, 1908.

annually over three thousand lives, and the rate is not only excessive, but it is increasing. Among railway trainmen the fatal accident rate while at work is nearly eight times the normal degree of accident frequency among males in all occupations, but even this rate is exceeded by deaths from drowning among the fishermen of Gloucester, resulting in a rate nearly twelve times the normal for men in all occupations. The degree of fatal accident liability varies, but it is high in most of the trades which can be considered at all dangerous, and there is evidence, conclusive and incontrovertible, that by rational methods of supervision and control the rates can be very materially diminished.

Regarding non-fatal accidents or injuries our information is much more imperfect, and is practically limited to a few of the more important dangerous occupations. In only one state has a real effort been made to arrive at a complete statement of the facts,—that is, Wisconsin,—but even there the effort as yet has not been entirely successful. The method of reporting non-fatal accidents varies so much that the returns for one state are seldom comparable with those for another. The same is true of different employments, for the returns may be complete for one industry, while for another they may be decidedly incomplete. There is also, of course, the inherent difficulty of giving a definite meaning to the term “accident,” applicable to all conditions and industries alike, but until such a definition is arrived at a valid comparison of the degree of injury frequency in different trades will be extremely difficult. In Wisconsin, during the last year for which the information is available, there were 5,003 industrial accidents of all kinds, and of this number 135, or 2.7 per cent., were fatal; 574, or 11.5 per cent., resulted in permanent incapacity; while 4,141, or 82.8 per cent., caused only temporary incapacity. Three per cent. of the accident returns were undefined.*

Similar investigations for other states or countries prove conclusively that the industrial accident factor is of sufficiently

* Special Report of the Bureau of Labor of Wisconsin, 1909.

serious importance to warrant the development of a deliberate policy of government in dealing with the problem. There is not at present sufficient accountability, on the one hand, or sufficient criminal and civil responsibility, on the other, for the occurrence of accidents which are plainly chargeable to gross negligence or criminal indifference on the part of either employer or employee, or both.

In the case of industrial accidents the evidence of serious injury or of wrongful death is more readily apparent than in the case of industrial diseases. That term is as yet too ill-defined to warrant its entire inclusion in a deliberate state policy of labor reform. A few diseases are clearly recognized as trade diseases, such as lead-poisoning, anthrax, glass-blowers' cataract, etc., but many other diseases which, if not directly caused by the employment, are certainly intensified or accelerated in their course, may fairly be considered as trade diseases, such as consumption and certain forms of respiratory disease which are strictly within the category of industrial affections, and which diminish the industrial efficiency of the workman, shorten his life, and result in premature death, often with most lamentable consequences to surviving wives, children, or other dependents.*

Any extended consideration of the subject of industrial diseases is, of course, out of the question in a discussion of this kind. Referring, however, to the frequency of consumption among persons employed in dusty trades, the evidence is overwhelming that in almost exact proportion to the amount of dust exposure, modified by the character of the dust inhaled, the proportion of deaths from consumption is excessive, and decidedly excessive, among the young and the workers of middle age. Normally at ages twenty-five to thirty-four, among males in all occupations there occur, in every one hundred deaths from all causes, thirty-one deaths from consumption. Among grinders, however, the corresponding proportion of deaths from consumption is 71 per cent.; among tool and in-

* See Report of Departmental Committee on Industrial Diseases, London, 1907.

strument makers, 59 per cent.; among printers, 56 per cent.; among stone-workers, 53 per cent.; among weavers, 53 per cent.; among spinners, 50 per cent.; and among woollen and worsted mill employees, 44 per cent.*

These few illustrations will suffice to prove that upon the human element in some branches of industry there fall the most serious and lamentable consequences of disease and death, but of which at the same time a considerable proportion consists of diseases and deaths which, in their nature, are more or less preventable. In fact, it is not going too far to say that the causes responsible for industrial diseases are much more subject to control and gradual elimination than the causes and conditions responsible for industrial accidents.

These are some of the facts of industrial accidents and industrial diseases which are a matter of official record and which cannot be explained away. These deaths and diseases cannot, in a large proportion of the number of their occurrences, in fairness be charged to negligence and indifference on the part of the workmen, and their consequences should, in equal fairness, not fall upon them or their dependents in the event of serious illness or premature death. Since it is a recognized principle of law that dangerous industries may rightfully be carried on as necessary to the existence of society itself, it follows as a matter of simple justice that the consequences of such industrial enterprise should not fall upon the workman who, because of the necessity to earn his living, is compelled to engage therein.

It is absurd to speak of the workman's free will, the preferential selection of a dangerous over a non-dangerous employment, and it is also absurd to speak of it as being a matter of choice whether a man will or will not continue to follow a given occupation, for we well know that to the vast majority of the men who toil there is no choice whatever in a matter of this kind. It also cannot be denied that there is much human toil that has in itself no compensation to the worker beyond the fact that

* See Bulletins 79 and 82 of the United States Bureau of Labor, Washington, 1908-09, on the Mortality from Consumption in Dusty Trades.

it furnishes the means of sustaining life. It is not going too far even to say that many of the more dangerous occupations gradually dull the senses to such an extent that what may apparently be an act of negligence and indifference is in truth but the result of the work itself. The responsibility for the social consequences of industrial accidents or illness should, therefore, not rest wholly upon the laborer, whose wage at best and at most has furnished very little more than a plain living, but in conformity to a spirit of justice it should be a burden upon the cost of production, or, in other words, the vital cost of the industry should be charged to the total cost of the product.

This principle is incorporated in the British workmen's compensation act of 1906, which is free from the objections to be raised against an elaborate system of government insurance such as has been carried into effect during the last twenty-five years in Germany. The latter system has certain very important advantages, and it has unquestionably been productive of a definite and clearly traceable amount of good, but the unseen harm of the system is, to my way of thinking, greater, or more of a disadvantage, than the material good that has resulted. It is not the duty of the state to make men happy, nor is it the duty of the state as a primary consideration or at other people's expense to make them contented; but it is the duty of government to deal justly with its citizens, and to bring about the best possible labor conditions without serious injury to industry itself.

The true solution of the difficulty is *prevention as a duty and relief as a right* voluntarily conceded to labor as a *policy of labor protection* instead of the present chaotic condition of economic insecurity. Of these two alternatives the former is, in my opinion, of vastly more importance at the present time than the latter. Prevention of industrial accidents and trade diseases is possible to a very considerable extent, and very much more so and at less cost than generally assumed. It is, unfortunately, true that preventive industrial medicine has not made the progress in the United States which might have been reasonably

expected, considering the vast amount of advance in this direction that has been achieved in England and on the Continent, and for conclusive trade mortality statistics, as well as for statistical data pertaining to trade morbidity, our chief reliance is upon foreign data and foreign experience, since these matters have been almost entirely neglected in this country.

The official reports on the mortality of the State of Massachusetts, which was the first in the United States to establish the registration of deaths, contain no information whatever upon the important matter of industrial accidents and trade diseases. No really scientific analysis is made of the large experience gained from year to year, and it is only very recently that the first attempt has been made to institute a fairly comprehensive inquiry to determine the actual sanitary condition of the factories of the State.* The investigation was rather limited, but the results, even in their present form, are decidedly suggestive and of the greatest possible practical value. Referring, for illustration, to tool and instrument makers, it is stated that "the workmen are not, as a class, long-lived. Indeed, the nature of the work is not compatible with longevity, and a person entering in middle life is unlikely to follow it for many years. At whatever age the trade is taken up, the man who has followed it a few years is an acknowledged rarity." Similar evidence is presented regarding many other employments more or less injurious to health and life.

The conditions responsible for an excessive mortality in industry are, however, subject to control, and effective methods of ventilation and dust removal will very materially mitigate the evils which are now of common occurrence. The evidence is available to prove that in the cutlery grinding shops of Solingen stringent police regulations governing cleanliness and dust removal have been followed by a material reduction in the mortality. The German law requires that the walls of the work-rooms must

* Reports on Sanitary Conditions and Dangerous Occupations, Senate No. 27, Jan. 12, 1905, and Senate No. 250, March, 1907. Published by the State Board of Health, Boston, Mass.

be lime-washed every year. The floors must be swept every evening and damp-wiped once a week. The rasing of grindstones is never undertaken during working hours except under a stream of water or unless the stone is entirely enclosed in casing, except at the working place of the rasing tool. The floors are kept clean, and provision is made for the removal of the dust during grinding. Cutlery manufacture is recognized as a dangerous trade, and in recent years considerable improvement has taken place in the prevention of dust. The grindstones and polishing wheels are run *toward* the worker, while in Sheffield, England, where the mortality is very much higher, they are run away from the worker, so that the dust has an upward tendency, and flies into the room. This is but one of many similar illustrations, but it is a pertinent one to emphasize trade conditions, over which the employees themselves have but a limited amount of control.

Commenting upon the unsatisfactory conditions in the stone industry at Quincy, the Massachusetts report previously referred to states that this is pre-eminently a dusty trade, and that the workmen are exposed to the danger of inhaling unabsorbable and irritating particles of mineral matter. Of 343 deaths which occurred in the city of Quincy among stone-cutters, no fewer than 142, or 41.4 per cent., were due to pulmonary tuberculosis, and 41, or 12 per cent. more, to other diseases of the lungs. This also is an industry where dust prevention is possible in a much more effective manner than has thus far been attempted, but in this case, as in so many others, the efforts at sanitary reforms are often opposed by the men themselves. Many years ago, in fact, Mr. Charles Francis Adams, in his treatise on railway accidents, pointed out how it had been necessary to make it a crime on the part of railway employees to remove the very safeguards adopted for their protection; and we are officially informed that among tool and instrument makers in Massachusetts, "in establishments properly equipped and conducted, provision is made to reduce the danger of dust to a minimum by means of hoods connected with a system of exhaust fans or blowers, but a very large proportion of grinders recklessly

remove the hoods and thus expose themselves unnecessarily to this especially dangerous form of dust."

It will thus be seen that the problem of labor protection is by no means a simple one, but that for its successful solution it depends upon the hearty and intelligent co-operation of employers and employees. Preventive measures will in the long run prove effective just as the safeguards in connection with the running of railway trains, and, while it will take time, patience, and expense, every investment of this kind will produce good results in the future. Even granting that the workmen themselves are, to a certain extent, responsible for the ills which affect them, the social consequences of their misconduct fall heavily upon dependent widows and children, who are of right entitled to the solicitude of the state.

It would carry me entirely too far to discuss the methods and means of accident or disease prevention which fall within the field of industrial medicine or industrial hygiene. Only one matter I may speak of, and that is the problem of ventilation and dust removal in trades which by their nature give rise to much dust production. In connection with this subject, which has not received much scientific attention in this country, I may mention the very valuable results obtained by an English departmental committee appointed to inquire into the ventilation of factories and workshops.* The two reports published by this committee prove conclusively that very material improvements are possible, and it necessarily follows that such improvements in the physical condition under which work is carried on will be followed by an improvement in health and longevity. The principle evolved out of these and similar investigations is precisely stated by Sir James Crichton-Browne as follows: "In contending with certain special kinds of dust, special appliances and arrangements are necessary; but for dust, as a whole, our aim should

* Ventilation of Factories and Workshops. Reports of Departmental Committee, First and Second, with Appendix. Parliamentary Reports, C. 1302 and Cd. 3552. London, 1902-07.

be to intercept and *remove it at its point of origin* and to insure a bounteous supply of fresh air."

The results to the industry itself as a direct means of increased industrial efficiency are stated, in the opinion of one leading manufacturer, as follows: "The effect of improved ventilation on the health of the workers has been good. We have had less staying away through sickness than before we had artificial humidity and ventilation in our sheds. The earnings have been more regular, but we do not find that they have increased as much as we expected; but the effect of the change has been advantageous to the manufacturer, the quality of the work being better and more perfect." Thus, as I had occasion to say in my article on the "Mortality from Consumption in Dusty Trades,"* "the effect of scientific ventilation of factories and workshops, and in particular the effective removal of industrial dust, combine to emphasize the need of more or less radical changes in the conditions as they exist at the present time."

It is, therefore, not only theoretically advisable, but practically feasible, to reduce the frequency of industrial diseases, of which consumption is numerically the most important. Other afflictions, more specifically recognized as trade diseases, such as phosphorus necrosis, lead-poisoning, and anthrax, are practically eliminated by a rigid control of the sanitary conditions under which the industries in which these diseases occur are in modern countries permitted to be carried on. While the problem is a more difficult one in the sanitary reform of the conditions which favor the spread of tuberculosis among indoor workers, the successful efforts which have been made in this direction encourage the hope that a material reduction in the mortality from these diseases can be brought about by a deliberate campaign directed specifically toward the elimination of the causes which give rise to disease.

What is true of trade diseases is true of industrial accidents, the number of which can be materially diminished by effec-

* Bulletin No. 79 of the United States Bureau of Labor, Washington, D.C., 1908 (includes extended list of references to occupation mortality).

tive rules and regulations governing the safe conduct of industrial activity. The actual number of fatal accidents in the coal mines of North America has increased from about 1,000 in 1898 to nearly 3,000 in 1907. The relative rate per 1,000 employed has changed for the worse from 2.6 during the first to 4.2 during the last year of the decade. In mining accidents, as in most industrial occupations, it is not the great calamities attracting world-wide attention that really are the most serious, but the accidents which occur from day to day and which are hardly even referred to in the daily press. Most of the accidents in coal mining are due to falls of roof, and, while this fact is well known and understood, as yet no really effective safety devices have been introduced to diminish the frequency of death from this preventable cause. I say preventable advisedly, because there is one very conclusive experience of a method adopted at the Courrières mines in France, which consists, first, in systematic timbering, second, in supplying the worker at the face with three iron bars which form a sort of temporary shield in advance of the last row of timber props. The expense of this precaution is practically nil, but the saving in life is measured by a positive decline in the death-rate from 0.76 per 1,000 employed at the mines during 1870-79 to 0.15 during the ten years ending with 1899. In contrast to this remarkably low death-rate from falls of roof the corresponding accident rate for all France was 0.59, and for the United Kingdom 0.79, while for the United States it is probably not much less than 1.5 per 1,000 employees, if not more.

Every branch of industrial activity is subject to peculiar conditions and circumstances which need to be studied, and in the light of which safety rules and regulations can be adopted. We as yet hardly make our industrial casualties a complete matter of official record, or, if this is done, the facts themselves are not presented in sufficient detail to warrant valid inferences and definite suggestions for remedial measures. Whatever opinion may be held regarding German government insurance, it has at least resulted in one immeasurable advance, and that

is the development of a deliberate policy of labor security against industrial accidents in all of the various trades embraced by the accident branch of the government insurance department. For each of these trades there has been carefully worked out a set of rules and regulations, and the rules themselves are placed conspicuously in every factory and workshop for the instruction and guidance of the workmen. The posting of these rules is required by law, and substantial penalties are attached to neglect of any of the precautions, safeguards, or safety devices which the rules and regulations call for. One simple rule, which has hardly as yet been adopted in any American factory, although it unquestionably tends successfully to protect life and limb, is that all dangerous parts of machinery must be *painted conspicuously in red*. Every dangerous part is also required to be enclosed in such a manner that loose clothing, hair, etc., cannot easily be caught by moving machinery. Manufacturers no longer make many machines without these protective devices, since they form a part of the actual cost of production and an integral element of factory expense.

Granting that many of these precautions, perhaps, go too far and involve a more or less needless expense in the aggregate, the sum thus wasted is but a small item compared with the enormous amount of good which is actually accomplished. What the German government does in this direction will in course of time unquestionably become the established practice in this country, because the practice itself is based upon sound considerations of public policy. The tendency of states under modern conditions, it has very well been said, is to approach one another to attain a degree of uniformity in at least the essential features of government, and in no field is such conformity more likely to be followed by beneficial results than in the development of a rational policy of labor protection, designed primarily to prevent needless industrial accidents and trade diseases.

After this rather extended consideration of the prevention of industrial accidents and industrial diseases as a social duty,

I can only very briefly touch upon the problem of relief or compensatory damages as a right. Employers' liability for wrongful death and personal injury is to-day a recognized principle in the social legislation of all civilized countries, but in the United States and its constituent states even the most advanced legislation leaves much, if not most, to be desired. Since all that need be said upon this subject has been admirably summarized in Bulletin No. 74 of the United States Bureau of Labor, those who wish for more information are referred to that publication.

The tendency of American law-making has been clearly in line with early English legislation, but we have hardly advanced beyond the English Employers' Liability Act of 1880, which has long since been superseded in England by the acts of 1897 and 1906. These last two acts have established the right of workmen to compensatory damages, and the consequences of wrongful deaths and injuries now properly fall upon industry, and not upon the labor employed therein. In brief, the English acts grant to workmen the right to three years' average wages in the event of accidental death; and, in the event of non-fatal accidents and certain industrial diseases, to compensation of one-half of the normal wages earned. The acts have been of very substantial advantage to wage-earners otherwise without adequate protection, and, so far as it is possible to judge, the resulting burden upon English industry has not been so serious as was originally anticipated.

As pointed out by Sir Thomas Oliver,* "A money value has been assigned to human life which, in the event of the death of a workman by accident, is in full dependency regarded as equivalent to the earnings of the three years immediately previous to the injury, to £150 as a minimum and £300 as a maximum." Fortunately, he observes, "it is only a small percentage of accidents that prove fatal." In regard to non-fatal accidents the Workmen's Compensation Act of 1906 provides for 50 per cent. of the wages being given as compen-

* "Some Medical and Insurance Problems arising out of Recent Industrial Legislation," by Sir Thomas Oliver, M.D., London, 1909.

sation to workmen during incapacity caused by accident occurring while at work, but the compensation is not to exceed £1 a week, and nothing at all is to be paid unless the incapacity lasts longer than one week.* There are, naturally, qualifications and exceptions, but for the present purpose they do not need to be considered. In the opinion of Sir Thomas Oliver, who has written very ably on the subject, there is not the least doubt that the Workmen's Compensation Act has imposed a heavy burden upon employers, but this becomes comparatively light when it is met by insurance and a distribution of the risk. To workingmen, he remarks, the gain through the act has been enormous. By employers distributing their claims over federated boards and insurance offices, injured workingmen have been placed beyond the pale of absolute poverty, —*an advantage not otherwise easily secured*. While these advantages are clearly recognized, there have unfortunately been substantial disadvantages, the importance of which it would not be wise to minimize.

The English experience since 1906 proves conclusively that in a not inconsiderable proportion of cases injured workmen have deliberately imposed upon their employers and have been recipients of pecuniary damages to which they were not rightfully entitled. While there has been no increase in fatal accidents, there has been a decided increase in minor accidents, and once more, to quote Sir Thomas Oliver, "statistics and experience prove that men who receive trivial injuries frequently extend their incapacity into the second week, with the object of securing compensation. In collieries it has been found that the number of non-fatal accidents lasting more than two weeks has steadily increased during the last ten years, so that in 1907 the number was almost double what it was in 1898." In Germany and France similar consequences have followed the establishment of compulsory insurance for accidents. These circumstances open up the important question as to how far, after injury, men honestly or dishonestly consider themselves

* The law reads that "if the incapacity lasts less than two weeks, no compensation shall be payable in respect of the first week."

disabled for work in order to receive compensation. There is, unfortunately, a strong temptation to men who have received minor injuries to protract the effects of these injuries into the second week and beyond so as to *receive payment*. This, however, is a subject which cannot be dealt with here in detail.

Not only has an additional burden been placed upon the industry, but a corresponding burden has fallen upon friendly societies. By insuring in two or three of these societies dishonest men are now enabled to secure a larger income through fraud and imposition than they could earn through honest work. Particularly has this been observed to be the case with miners, and the sickness experience of some of the societies in the mining districts has been 20 per cent. to 75 per cent. greater than expected. Experience shows that, since the Workmen's Compensation Act of 1906 came into force, men are longer on the sick list than formerly, and they are becoming more and more disinclined to recommence work than in former years. Incapacity under the present act has, therefore, a money value which decidedly encourages malingering.

The moral consequences of the Workmen's Compensation Acts have not, therefore, been favorable. Compulsory insurance on the Continent has also failed to bring about a higher sense of personal responsibility on the part of the beneficiaries, who have not been slow to abuse the advantages of humane measures intended solely for their benefit. It has been stated at one of the meetings of the British Medical Association, by one in authority to express a qualified opinion on the subject, that "it is sad to find by painful experience to what an extent unfair advantage is taken of this act by some of those for whose benefit the laws were framed. Instead of honestly trying to get back to work as soon as possible, thus proving their manly independence and retaining their self-respect, the injured workmen in too many instances try to persuade themselves and their medical examiners that they are incapacitated for work long after their condition justified such a contention. The hope of obtaining a lump sum in such compensation no doubt acts in

some cases as a strong motive to confess that no improvement is taking place in their condition."

Even more lamentable has been the wholly unexpected development of dishonest medical practice to secure to the injured workmen benefits to which they are not rightfully entitled. In France, according to an article in the *British Medical Journal*, doctors do not hesitate to give false certificates, which are used by workmen to extort compensation. These and other difficulties are, of course, too involved to receive extended consideration at this time. The available evidence, however, is sufficiently clear that the passage of drastic workmen's compensation acts is certain to be followed by more or less unfavorable consequences, both financial and moral, unless the provisions are framed with extreme care and a method of rigid and expert supervision is employed by which alone imposition, malingering, and fraud can be reduced to a minimum.

The alternative to workmen's compensation laws is compulsory workmen's accident insurance on a contributory or a non-contributory basis. The German compulsory system in actual practice has some decided advantages over the English. In the accident branch the whole burden of cost falls upon industry, and there are no contributions from the workmen. The interrelation of the accident branch with the sickness and old-age and invalidity branches makes it difficult clearly to establish the true incidence of cost, since, for the first thirteen weeks of injury, accident cases are compensated for out of the sick fund. Since, however, only a part of the accident risk is really inherent in the industry, and since many accidents occur which are due to other causes than industrial employment, it seems but fair that the workmen should contribute their share to obtain the largest possible benefit on an equitable and moral basis of benefits received for services rendered. The English and German precedents, however, will probably defeat propositions for joint contributions on the part of employers and employees to meet the complete risk of industrial accidents and industrial diseases. From a practical point of view there is much to be said in favor of this principle. It is

necessary to keep in mind that, aside from other reasons, the first requirement is absolute certainty to the workman and his family that compensation will be made in the event of death or incapacity to work, as the result of accidental injury, whether the accident results from his own or his employer's faults and shortcomings or because of the true accident liability inherent in all employments.

Granting, therefore, the right of workmen to compensation under any and all circumstances arising out of industrial accidents and certain well-defined forms of industrial disease, the question remains whether the remedy lies in the direction of the workmen's compensation law of England or the German compulsory system of insurance. The German system in practice has advantages which, thus far at least, have not resulted from the English system. Under the latter the risk to the employer is covered by employers' liability insurance, the cost of which is probably as great, if not greater, in some industries at least, as under the German system. Sir Thomas Oliver has pointed out that the insurance premium has increased from 9s. 3d. per £100 of the wages paid in 1900 in the case of a large coal owners' association to 19s. per £100 in 1907, or more than 100 per cent. In the case of a large engineering firm at Newcastle the rate to-day is nearly twice what it was formerly. It is pointed out, however, that employers who have their own accident funds can run the insurance cost at a smaller sum than when done through an insurance office, which in some trades more dangerous than others may require 15s. or more per £100 of insurance. The cost of insurance rises naturally the more hazardous the trades are considered, but the insurance premium under the English system is only a rough approximation to the risk.

This difficulty is met in the German system by trade associations into which the employers in clearly defined industries are compelled to organize so that each branch of trade pays its own trade risk. The burden is equitably distributed among the different branches by a revision of the actual experience at least once in every five years. The resulting so-called danger

tariffs are in almost exact conformity to the true accident factor in different branches of the industry. For example, in textile manufacture the rate varies from 0.2 per cent. of the wages paid in the case of hand-loom weavers to 3.8 per cent. in the case of shoddy manufacture. It is self-evident that in all these industries there are many mechanical, allied, contiguous, and supplementary employments where the accident rate may be much higher or lower than in the risk of the industry as a whole. It is, therefore, only fair that every well-defined branch of the industry should pay its proportionate share of cost. To illustrate, in textile manufacture the spinning and weaving rooms should be separate and distinct in their contributions to the accident fund from the picking and carding rooms, and in mining the labor above ground should not be charged with the same rate of contributions as the labor below ground. While this at first may seem very complicated, it has, nevertheless, been found practicable in German experience to perfect the danger tariffs with a remarkable degree of success, hence the burden of accident insurance, as it falls upon German industry, is almost identical with the true risk of the trade, and there is in this respect practically no serious complaint.

Since, under the German system, employers are federated in accident insurance institutions, they are subject only to statutory requirements as to what they must do and what they must not do, but otherwise they have complete control over their own affairs. They are supervised through the Imperial Insurance Office, but there is a minimum degree of actual interference, and this only for strictly justifiable causes. The German system, therefore, makes it decidedly to the interest of every branch of industry to reduce accidents and industrial diseases to a minimum, and, while even under the German system malingering cannot be prevented, there are strong reasons to believe that there is less of it in Germany than in England.

The remarkable success with which industry is supervised in all its branches at a minimum of expense and a maximum of benefits is in itself a justification for the German system, even

if it did not as a first consideration grant to workingmen financial relief as a right in the event of accidental injury. It imposes the *duty* upon all industrial establishments to improve the conditions of work and to reduce industrial accident and disease liability to a minimum. This has been carried out through thoroughly intelligent rules and regulations of accident and disease prevention, which are without a parallel in any other part of the world. There are no workmen to-day anywhere whose health and safety are better safeguarded than the workmen in German industrial establishments, and there is not the slightest doubt but that the effect of these rules and regulations has been far-reaching in both its moral and economical consequences. The industrial efficiency of the German workman in important respects is superior to that of any other, because his health and his strength are better conserved than is the case in other lands. Many valuable lives are saved or prolonged, which represent years of industrial experience and acquired ability, and which are recklessly wasted or destroyed in our own country.

While for the time being we have certain economic and other industrial advantages, and while our native-born workmen have admittedly a higher degree of mechanical skill, ingenuity, and adaptability to new processes of manufacture, this is probably only a transitory condition which must soon pass away. Where the German workman has a substantial advantage is in the fostering of the conditions which favor plodding industry and average mechanical skill, accompanied by rising wages and shorter hours, which, after all, make up the sum and substance of enduring industrial success. In the sustaining of these qualities and in the perfection of these abilities the German accident insurance system is unquestionably of the greatest possible assistance.

When a system or method of social reform is productive of decidedly beneficial results to the people of one country, it is certain to cause the adoption of similar or corresponding methods in other countries. Whether American employers of labor will ultimately be compelled by law to make specific

compensation for industrial accidents and diseases, but in a more or less haphazard manner and subject to the risk of widespread imposition and fraud, or whether they will succeed in meeting this liability by employers' liability insurance, or whether they will voluntarily inaugurate a system of workmen's insurance through the federation of large industries and joint contributions to a common fund, are, of course, open questions to which at this time no answer can be given. It is certain, however, that one of these methods will finally be adopted.

All problems of this character depend for their successful solution upon a sound basis of statistical facts. While the present state of our knowledge with regard to the true degree of accident or disease frequency in industry is not very satisfactory, nevertheless, data to a considerable amount are available, which have been briefly consolidated in the form of a series of tables in the Appendix to this paper. The tables will afford a convenient means of reference, since most of the facts are not easily obtained in their present form, even from the official reports which contain them. They will prove useful to those who are interested in the best possible solution of the problem under consideration, as well as in a correct presentation, of the available facts regarding the probable rate of accident frequency in American industry and the related subjects of American employers' liability insurance experience and workmen's compensation law in England.

Granting that the day is not far distant when employers' liability will be both real and practical and when the right of the employee to relief or compensation will be made corresponding to the duty on the part of the employer to introduce all reasonable safety precautions and devices, large employers of labor would seem to be indifferent to their own interests in not taking time by the forelock in the inauguration of federated accident institutions, with a full equipment of modern methods for technical supervision and resulting accident and disease prevention. There can be no doubt that the actual cost of the most effective method of accident insurance, granting to the

employee in the event of injury, or to his family in the event of his death, a sufficient amount of compensation to at least materially mitigate the economic consequences of that disaster, is a duty and a necessity of the not far distant future. Equally clear is the growing sense of community responsibility, that many, if not most, of the accidents which do occur ought not to occur, and that they are the result of carelessness and indifference on the part of both the employer and the employee. The community should insist on the recognition of accident and disease prevention as an employer's duty, and indifference to recognized methods of accident and disease prevention should be punished under the criminal law. Life and health in industry will certainly, in course of time, become matters of more serious importance than they are to-day, and those who recklessly and wilfully endanger the well-being of their workmen will be, as they ought to be, severely punished under the criminal law. When the community is awakened to its responsibility and insists upon the prevention of accidents and industrial diseases as a duty, and when it realizes the social necessity of reasonable and rational compensation of injured workmen as a right, the ultimate effect will be of vast benefit to the nation as a whole and the United States will then be placed on a par with the other civilized nations of the world.

TABLE I.

NUMBER AND PER CENT. OF DEATHS FROM ACCIDENTS AMONG MALES AND FEMALES
FIFTEEN YEARS OF AGE OR OVER, IN THE REGISTRATION AREA OF THE UNITED STATES,
BY CAUSES, 1900-07.

(Compiled from the Reports of the Bureau of the Census on "Mortality." Persons whose
Age was not reported have been excluded.)

Cause of Death.	Males.		Females.	
	Number.	Per Cent.	Number.	Per Cent.
Burns and scalds	4,316	2.8	6,802	18.2
Drowning	19,043	12.4	1,607	4.2
Fractures, dislocations	13,365	8.7	6,394	17.2
Gunshot	6,369	4.2	774	2.1
Machinery	2,958	1.9	53	0.1
Mines, quarries	5,298	3.5	6	0.0
Poisoning, by gases	5,754	3.8	3,197	8.6
Poisoning, other causes	4,776	3.1	3,233	8.7
Railroad	38,372	25.1	2,821	7.6
Suffocation	1,115	0.7	275	0.7
Sunstroke	4,464	2.9	2,077	5.6
Vehicles, horses	5,587	3.7	568	1.5
All other causes	41,711	27.2	9,470	25.4
Total	153,128	100.0	37,277	100.0

TABLE II.

NUMBER AND PER CENT. OF INDUSTRIAL ACCIDENTS IN THE UNITED KINGDOM TO PERSONS OF EACH SEX EIGHTEEN YEARS OF AGE OR OVER, BY DEGREE OF INJURY, FOR THE PERIOD 1895-1908.

(Compiled from Annual Reports of the Chief Inspector of Factories and Workshops of the United Kingdom, 1895-1908.)

Degree of Accidental Injury.	Accident to			
	Males.		Females.	
	Total.	Per Cent.	Total.	Per Cent.
Fatal	11,392	4.4	158	0.5
Non-fatal:				
Loss of right hand or arm	685	0.3	80	0.3
Loss of left hand or arm	596	0.2	52	0.2
Loss of part of right hand	11,155	4.4	2,015	6.7
Loss of part of left hand	11,757	4.6	1,414	4.7
Loss of any part of leg or foot	1,051	0.4	14	0.1
Fracture of limbs or bones of trunk	7,458	2.9	471	1.6
Fracture of hand or foot	5,865	2.3	714	2.4
Loss of sight of one or both eyes	560	0.2	118	0.4
Injuries to head and face	25,053	9.8	2,883	9.7
Burns and scalds	35,274	13.8	1,022	3.4
Lacerations, contusions, etc.	145,383	56.7	20,867	70.0
Total non-fatal	244,837	95.6	29,650	99.5
Total fatal and non-fatal	256,229	100.0	29,808	100.0

TABLE III.

NUMBER AND PER CENT. OF FATAL AND NON-FATAL ACCIDENTS IN THE INDUSTRIES OF
NEW YORK STATE, BY CAUSES, 1901-07.

(Compiled from the Annual Reports of the New York Bureau of Factory Inspection,
1901-07.)

Causes.	Fatal Acci- dents.		Non-fatal Accidents.		Total Acci- dents.	
	Num- ber.	Per Cent.	Num- ber.	Per Cent.	Num- ber.	Per Cent.
Gearing, belts, shafting, pulleys, etc. . .	224	15.4	4,573	6.5	4,797	6.6
Elevators, hoists, cranes, etc.	315	21.6	5,219	7.4	5,534	7.7
Saws, planes, lathes	58	4.0	5,277	7.4	5,335	7.4
Presses, stamping machines	7	0.5	3,892	5.5	3,899	5.4
Emery wheels and buffers	12	0.8	1,590	2.2	1,602	2.2
Textile machinery	8	0.5	2,611	3.7	2,619	3.6
Other machines and machine tools . . .	99	6.8	12,856	18.2	12,955	18.0
Total machinery	723	49.6	36,018	50.9	36,741	50.9
Hand tools (axes, saws, hammers) . . .	—	—	2,894	4.1	2,894	4.0
Explosives	82	5.6	552	0.8	634	0.9
Hot liquids, acids, steam, etc.	134	9.2	3,219	4.6	3,353	4.6
Collapse of buildings and falling objects.	144	9.9	5,616	7.9	5,760	8.0
Fall of persons	129	8.8	4,790	6.8	4,919	6.8
Handling of merchandise	49	3.3	7,609	10.8	7,658	10.6
Vehicles and animals	76	5.2	1,990	2.8	2,066	2.9
All other causes	122	8.4	8,032	11.3	8,154	11.3
Total other than machinery	736	50.4	34,702	49.1	35,438	49.1
Grand total	1,459	100.0	70,720	100.0	72,179	100.0

TABLE IV.

NUMBER AND PER CENT. OF INDUSTRIAL ACCIDENTS IN NEW YORK STATE, BY DEGREE OF INJURY, DECEMBER 1, 1900, TO JUNE 30, 1909.

(Compiled from the Reports of the New York Bureau of Factory Inspection, 1901-09.)

Degree of Accidental Injury.	Accidents Reported.	
	Number.	Per Cent.
Temporary disablement:		
Lacerations	15,198	17.9
Burns	5,991	7.0
Cuts, etc.	12,946	15.2
Bruises	14,947	17.6
Sprains and dislocations	3,522	4.1
Fractures	3,735	4.4
Other injuries	9,590	11.3
Total temporary disablement	65,929	77.5
Permanent disablement:		
Partial or complete loss of eyes	362	0.4
Partial or complete loss of limbs	270	0.3
Partial or complete loss of hands or feet	357	0.4
Internal injuries	533	0.6
Other injuries	15,931	18.7
Total permanent disablement	17,453	20.4
Degree of injury not stated	81	0.1
Fatal accidents	1,663	2.0
Total accidents of all degrees	85,126	100.0

TABLE V.
INDUSTRIAL ACCIDENTS IN WISCONSIN, 1906-08.

Years.	Total Number of Accidents Reported.	Accidents to Em- ployees while at Work.	Per Cent. of Acci- dents to Employees.
1906-07	13,572	7,186	52.9
1907-08	10,392	5,003	48.1

TABLE VI.
FATAL AND NON-FATAL ACCIDENTS TO EMPLOYEES, WISCONSIN, 1907-08.

Degree of Accidental Injury.	Number.	Per Cent.
Fatal	135	2.7
Permanent	574	11.5
Temporary	4,141	82.8
Not stated	153	3.0
Total	5,003	100.0

TABLE VII.
FATAL INDUSTRIAL ACCIDENTS BY AGE (MALES), WISCONSIN, 1907-08.

Age.	Number.	Per Cent.
10-15	3	2.22
16-24	39	28.89
25-44	51	37.78
45-64	33	24.44
65-	9	6.67
Total	135	100.00

TABLE VIII.

DURATION OF INCAPACITY, WISCONSIN, 1906-08.

Probable Duration of Injury.	1906-07.		1907-08.	
	Number.	Per Cent.	Number.	Per Cent.
Not over two weeks	1,520	21.1	1,618	32.4
Over two weeks, not over one month . .	3,481	48.4	2,129	42.6
Over one month, not over two months .	1,019	14.2	749	14.9
Over two months, not over three months,	244	3.4	180	3.6
Over three months, not over six months .	122	1.7	85	1.7
Over six months	25	.4	11	.2
Fatal	204	2.8	135	2.7
Duration not predicted	571	7.9	96	1.9
Total	7,186	100.0	5,003	100.0

TABLE IX.

METHOD OF INJURY IN INDUSTRIAL ACCIDENTS, WISCONSIN AND NEW YORK.

Causes.	Wisconsin, Year ending June 30, 1908.		New York, Year ending Sept. 30, 1907.	
	Number.	Per Cent.	Number.	Per Cent.
Mechanical power	1,679	33.56	9,046	46.56
Heat and electricity	304	6.07	1,580	8.13
Fall of person	684	13.67	1,535	7.90
Injured by weights	1,097	21.93	4,114	21.17
Flying objects	173	3.46	742	3.82
Vehicles and animals	171	3.42	423	2.17
Miscellaneous	895	17.89	1,991	10.25
Total	5,003	100.00	19,431	100.00

TABLE X.

FATAL ACCIDENTS TO RAILROAD EMPLOYEES IN THE UNITED STATES.

Years.	Number Employees.	Number Killed.	Fatal Acci- dent Rate per 1,000 Employees.
1893	873,602	2,727	3.12
1894	779,608	1,823	2.34
1895	785,034	1,811	2.31
1896	826,620	1,861	2.25
1897	823,476	1,693	2.06
1898	874,558	1,958	2.24
1899	928,924	2,210	2.38
1900	1,017,653	2,550	2.51
1901	1,071,169	2,675	2.50
1902	1,189,315	2,969	2.50
1903	1,312,537	3,606	2.75
1904	1,296,121	3,632	2.80
1905	1,382,196	3,361	2.43
1906	1,521,355	3,929	2.58
1907	1,672,074	4,534	2.71
1893-97	4,088,340	9,915	2.43
1898-02	5,081,619	12,362	2.43
1903-07	7,184,283	19,062	2.65
1893-1907	16,354,242	41,339	2.53

TABLE XI.

FATAL ACCIDENTS TO BITUMINOUS COAL MINERS, UNITED STATES.

Years.	Number Employees.	Number Killed.	Fatal Acci- dent Rate per 1,000 Employees.
1894	237,599	501	2.11
1895	243,227	617	2.54
1896	243,439	601	2.47
1897	248,268	511	2.06
1898	255,705	624	2.44
1899	267,440	756	2.83
1900	307,825	1,054	3.42
1901	335,279	971	2.90
1902	365,229	1,376	3.77
1903	407,027	1,211	2.98
1904	421,236	1,367	3.25
1905	454,081	1,515	3.34
1906	475,086	1,478	3.11
1907	486,717	2,038	4.19
1908	485,254	1,951	4.02
1894-98	1,228,238	2,854	2.32
1899-03	1,682,800	5,368	3.19
1904-08	2,322,374	8,349	3.60
1894-1908	5,233,412	16,571	3.17

TABLE XII.

FATAL ACCIDENTS TO ANTHRACITE COAL MINERS, PENNSYLVANIA.

Years.	Number Employees.	Number Killed.	Fatal Acci- dent Rate per 1,000 Employees.
1894	139,655	439	3.14
1895	143,605	421	2.93
1896	149,670	502	3.35
1897	149,557	423	2.83
1898	142,420	411	2.89
1899	140,583	461	3.28
1900	143,826	411	2.86
1901	147,651	513	3.47
1902	148,141	300	2.03
1903	151,827	518	3.41
1904	161,330	595	3.69
1905	168,254	644	3.83
1906	166,175	557	3.35
1907	168,774	708	4.19
1908	174,503	678	3.89
1894-98	724,907	2,196	3.03
1899-03	732,028	2,203	3.01
1904-08	839,036	3,182	3.79
1894-1908	2,295,971	7,581	3.30

TABLE XIII.

EMPLOYERS' LIABILITY IN THE UNITED STATES, 1887-1908.

Years.	Premiums.	Losses.	Percentage of Losses to Premiums.
1887	203,132	32,924	16.21
1888	357,426	104,803	29.32
1889	628,017	180,045	28.67
1890	851,681	378,998	44.50
1891	2,126,286	755,720	35.54
1892	3,925,429	1,725,313	43.95
1893	1,788,178	798,589	44.66
1894	2,884,790	1,211,427	41.99
1895	4,002,140	2,090,523	52.23
1896	4,205,902	2,296,114	54.59
1897	4,375,447	2,152,653	58.20
1898	5,067,389	2,333,602	46.10
1899	6,052,901	2,571,532	42.48
1900	7,129,414	2,758,122	38.69
1901	8,328,834	3,321,697	39.88
1902	11,538,635	3,962,010	34.34
1903	13,613,881	4,838,798	35.54
1904	14,423,684	4,838,798	33.55
1905	15,767,818	5,272,664	33.44
1906	18,748,949	8,440,933	45.02
1907	21,999,792*	9,479,238*	43.09*
1908	27,938,311	10,052,125*	35.98*

* The statistics for 1907 and 1908 have been compiled from returns in The Spectator Year Books for 1908 and 1909. The statistics for the period 1887 to 1906 are from the reports of the New York State Insurance Department.

TABLE XIV.

EMPLOYERS' LIABILITY INSURANCE,* PERCENTAGE OF LOSS TO PREMIUM INCOME.

Company.	1899-1903.	1904-08.
Ætna	56.49	41.35
American Fidelity	—	18.92
American Mutual	61.80	39.65
Casualty Company of America	—	32.24
Contractors' Mutual	—	7.16
Employers	53.38	32.07
Fidelity and Casualty	57.44	36.20
Frankfort	60.50	36.84
General Accident	31.55	35.52
London Guarantee	56.23	32.34
Maryland	53.40	35.04
New Amsterdam	57.00	30.33
Norwich and London	—	12.73
Ocean	52.98	38.80
Standard	46.60	33.17
Travelers	55.87	33.94
United States	46.53	34.21

* The Spectator, Oct. 29, 1908.

TABLE XV.

EMPLOYERS' LIABILITY INSURANCE, EXPERIENCE IN THE UNITED STATES,* 1889-1903

(From Monthly Bulletin of the Fidelity and Casualty Company, September, 1906.)

Embraces the Experience in the United States in All the Various Classes of Industries.

Years.	Wage Expenditure.	Number of Accidents reported.	Accidents per \$100,000 of Wages.
1889	\$36,714,928	1,254	34.15
1890	81,799,402	3,934	4.81
1891	92,999,412	6,003	6.46
1892	112,699,535	7,894	7.00
1893	118,534,441	7,002	5.91
1894	126,196,490	9,995	7.92
1895	137,935,889	12,475	9.04
1896	118,759,879	11,245	9.46
1897	134,812,370	14,088	10.40
1898	138,207,715	16,283	11.77
1899	137,197,766	15,583	11.36
1900	147,364,535	15,692	10.65
1901	164,765,607	19,001	11.53
1902	182,450,914	22,683	12.43
1903	175,076,525	21,956	12.54
Total	\$1,905,515,398	185,088	9.71

* It is explained with reference to these statistics that:—

"It is important to remember that these figures cannot be absolutely relied upon. Some of the insured are exceedingly careful and report every accident, however trifling, to us; others report only the serious accidents. In the main, however, the one probably offsets the other. There is a tendency, it would seem, in the direction of reporting every accident. There are more accidents reported in recent years. This is due, without doubt, to greater care in reporting, and not to greater frequency of accidents."

TABLE XVI.

EMPLOYERS' LIABILITY INSURANCE, EXPERIENCE IN THE UNITED STATES, 1889-1903.

(From Monthly Bulletin of the Fidelity and Casualty Company, September, 1906.)

Embraces the Experience in the United States during the Years 1889-1903, Inclusive.

Classes of Industries.	Wage Expenditure.	Number of Acci- dents.	Number of Persons employed on As- sumption of Average Annual Wages of \$500	Propor- tion of Persons injured. 1 in	Acci- dents per \$100,000 of Wages.
Bakers and confectioners . . .	\$35,620,283	1,729	71,240	41.20	4.86
Bridge builders	6,554,298	2,855	13,108	4.59	43.57
Carriage and wagon builders . .	17,558,322	1,180	35,110	29.75	6.72
Chemical and color works . . .	69,557,839	5,587	139,115	24.89	8.03
Contractors	151,473,698	27,657	302,947	10.95	18.26
Electric light and power . . .	26,631,740	3,749	53,263	14.20	14.08
Leather	64,117,232	2,420	108,254	44.73	3.77
Lumber	129,698,868	15,575	259,397	16.65	12.01
Metal works	377,064,010	44,723	754,128	16.86	11.86
Milling	14,471,238	675	28,942	42.87	4.66
Mining	115,264,632	11,225	230,529	20.53	9.73
Miscellaneous	190,763,263	14,755	381,526	25.85	7.74
Oil	12,081,597	1,516	24,163	15.93	12.55
Ore reduction	28,025,226	2,574	56,050	21.77	9.18
Paper	55,382,868	4,505	110,765	24.61	8.14
Pottery	53,681,734	2,422	107,363	44.32	4.51
Printing	54,884,422	1,996	109,768	55.04	3.63
Quarries and stone-cutters . .	42,387,902	3,433	84,775	24.69	8.10
Stamping	7,174,327	2,024	14,348	7.08	28.22
Stevedores and steamships . .	50,365,638	7,795	100,731	12.91	11.88
Textile	222,560,852	7,579	445,121	58.73	3.41
Warehouses and stores . . .	47,788,370	1,888	95,576	50.62	3.95
Wood	129,072,020	15,868	258,144	16.27	12.29
Special risks	3,335,019	1,358	6,670	49.11	40.75
Total	\$1,905,515,398	185,088	3,811,030	20.59	9.71

TABLE XVII.

WORKMEN'S COMPENSATION STATISTICS, GREAT BRITAIN, 1908.

Industry.	Number employed.	Fatal Accidents.		Disablement Cases.	
		Number.	Rate per 1,000 Employees.	Number.	Rate per 1,000 Employees.
Shipping	235,001	371	1.58	5,877	25.01
Factories	5,497,988	951	0.17	136,357	24.80
Docks	67,929	156	2.30	10,591	155.91
Mines	1,047,862	1,301	1.24	137,622	131.34
Quarries	85,475	88	1.03	5,284	61.82
Construction work	127,106	119	0.94	6,805	53.54
Railways	451,392	461	1.02	20,688	45.83
Total	7,512,753	3,447	0.46	323,224	43.02

TABLE XVIII.

WORKMEN'S COMPENSATION STATISTICS, GREAT BRITAIN, 1908.

Industry.	Fatal Cases.			Disablement Cases.		
	Number Cases.	Total Compensation.	Average Compensation.	Number Cases.	Total Compensation.	Average Compensation.
Shipping	371	\$298,446	\$804.44	5,877	\$250,691	\$42.66
Factories	951	635,042	667.76	136,357	3,213,025	23.56
Docks	156	103,422	662.96	10,591	317,361	29.97
Mines	1,301	1,100,816	846.13	137,622	2,928,592	21.28
Quarries	88	55,964	635.95	5,284	112,190	21.23
Constructional work	119	65,939	554.11	6,805	186,217	27.36
Railways	461	329,501	714.75	20,688	404,262	19.54
Total	3,447	\$2,589,130	\$751.13	323,224	\$7,412,338	\$22.93

TABLE XIX.

COMPARATIVE FATAL ACCIDENT RATES IN HAZARDOUS OCCUPATIONS IN THE UNITED STATES.

Occupations.	Period.	Number of Em- ployees.	Num- ber Killed.	Rate per 1,000 Em- ployees.
Fishermen (Gloucester fisheries)	1897-1906	44,145	516	11.69
Railway trainmen	1898-1907	2,351,295	17,924	7.62
Coal miners (Colorado)	1899-1908	103,832	635	6.12
Iron miners, inside (Dickinson Co., Mich.)	1897-1906	22,405	111	4.95
Iron miners (Marquette Co., Mich.)	1899-1908	56,030	243	4.34
Railroad switch-tenders, crossing-tenders, and watchmen	1898-1907	489,492	2,126	4.34
Coal miners, anthracite (Pennsylvania)	1899-1908	1,571,064	5,385	3.43
Coal miners, bituminous (United States)	1899-1908	4,005,174	13,717	3.42
Lead and zinc miners (Missouri)	1898-1907	119,296	359	3.01
Metal miners (Colorado)	1897-1906	347,856	990	2.85
Copper miners (Houghton Co., Mich.)	1894-1903	110,241	309	2.80
Coal miners (Illinois)	1899-1908	508,089	1,383	2.72
Iron miners, outside (Dickinson Co., Mich.)	1897-1906	9,475	24	2.53
Coal miners (Missouri)	1899-1908	89,182	122	1.37
Railway mail clerks	1897-1906	98,077	111	1.13
United States Life Saving Service	1897-1906	19,992	17	0.85

PROCEEDINGS OF THE QUARTERLY MEETING OF
THE AMERICAN STATISTICAL ASSOCIATION,
WASHINGTON, D.C., SEPTEMBER 24, 1909.

A regular quarterly meeting of this Association was held at the Ebbitt House, Washington, D.C., at 6 P.M., Friday, September 24. The meeting consisted of a brief informal reception, followed by a dinner at which sixty-eight members and guests were present. Harry T. Newcomb presided at the post-prandial exercises. Addresses were delivered by Hon. E. Dana Durand, Director of the Census, and Dr. Cressy L. Wilbur, Chief Statistician of the Division of Vital Statistics, Bureau of the Census. In accordance with the custom of the Association the papers were freely discussed by several of the members and guests.

At the close of the discussion of the papers it was voted to hold another meeting of the Association at the same place on October 25 following, and to extend an invitation to the members of the American Public Health Association and of the Association of American Government Accountants. The following committee was appointed to have charge of the arrangements: E. Dana Durand, Charles S. Sloane, George K. Holmes, Cressy L. Wilbur, and Jean P. Muller.

The meeting then adjourned.

CARROLL W. DOTEN, *Secretary.*

INTRODUCTORY REMARKS.

BY H. T. NEWCOMB.

It is naturally a memorable moment in the history of a reformed statistician when he is permitted to call to order a gathering composed of the leading active workers in the fields from which he has departed in order to lead a different life. I therefore thank you for the honor conferred in permitting me to preside on this notable occasion.

The purposes of the American Statistical Association, as I understand them, are to encourage the use and perfect the processes of a scientific method of study that is, perhaps, especially applicable, and certainly has been most extensively used in connection with the social sciences. These purposes are eminently practical, and it is an eminently practical incident of their execution that there should be frequent meetings of the Association in the city of Washington. For Washington is the scene of a greater amount of statistical activity than any other city in the world, and holds a very large number of the ablest and most experienced workers in statistics.

Both the American Statistical Association and these workers have much to gain by the comparison of methods and ideals for which such meetings as this afford opportunity. Every statistical worker ought to look upon a membership in the Association as both an honor and an opportunity, — an honor on account of its history and associations, an opportunity on account of its potential service to him and the services which he can render through the Association to his coworkers in statistics.

The Association was organized in 1839, the year which saw the beginning of the series of publications of the Royal Statistical Society. From the beginning its list of members has included many of the most honored names among American students of social conditions, and for a long time its member-

ship has been actually international. Its publications are now sent regularly to members in substantially every State of the Union and in most of the civilized nations of the world. These publications, issued continuously during a period of twenty-two years, cover a wide range of inquiry, and are valuable and practical contributions to our knowledge of social conditions.

This occasion cannot be allowed to pass without a pause of affectionate respect for two of the distinguished Presidents of the Association, both of whom earnestly wished to see the Association strong and active in Washington. Some ten or twelve years ago, when the first meeting in this city was held, General Francis A. Walker came here especially to aid and encourage our undertaking, and Colonel Carroll D. Wright was, of course, the leader, without whose support we would not have ventured to proceed. Each of these great men served long in turn as President of the Association, and each was for many years the unquestioned leader of statistical work at the nation's capital.

Francis A. Walker, soldier, scholar, statesman, and statistician, so far outranks his predecessors in the field of statistics as to seem its first really great figure. He planned and executed the first satisfactorily comprehensive decennial census and first gave a really scientific character to national statistical activity. He was the ideal American citizen, and the wide range of his services and achievements has scarcely a parallel.

In Carroll D. Wright, General Walker had a worthy successor. Colonel Wright had been a capable soldier, a wise and efficient legislator, before his exceptional service at the head of the Massachusetts Bureau of Statistics of Labor made his selection as the first Federal Commissioner of Labor so plain a duty that an out-going Republican President and his Democratic successor agreed that no other name ought to be considered. It would be superfluous to speak on this occasion of the immensity of his contribution to statistics, for I am but the least in this gathering in capacity to estimate its value. He was an unfailing inspiration to those of us who worked in statistics in Washington during his service here. His door was

always open to those who sought counsel concerning their work, he made their problems his own, his suggestions were generous and helpful, his good-nature was unfailing. To have enjoyed such an association and to have shared some of the hours not given to labor, when his genial nature, his breadth and warmth of sympathy, and his keen and kindly humor brought into view another phase of his manly and exalted character, I shall always regard as among the highest of privileges.

But we turn from the past, characterized by great men and brilliant achievements, to a present full of promise. The direction of great statistical undertakings is full of exhausting labor, and requires the strength and initiative of young men. The great men of whom I have spoken came to their own while very young as compared with men called to equal responsibilities and prominence in other fields. Other young men have been called to fill the places which they filled, and have taken up their labors with equal devotion to duty, with purposes equally noble, and, we believe, with equal promise of successful achievement. Their labors are so linked to a great past that they cannot choose but to strive greatly. It will be our pleasure to listen this evening to statements of the plans and purposes of some of the best qualified among them.

CENSUS METHODS.

BY HON. E. DANA DURAND, DIRECTOR OF THE CENSUS.

Accuracy is the fundamental requirement of all statistical work. This means, first, accuracy in collecting the original material; second, accuracy in compiling and tabulating it; and, third, accuracy in analyzing and interpreting it. The first and third stages in the process of statistical work are extremely difficult, and it is concerning these that I wish especially to speak. It is a matter of comparative simplicity to secure accuracy in compiling and tabulating statistics. The principal problem here is to secure economy of time and money. A few words only as to the methods of compilation and tabulation contemplated for the coming census will be sufficient.

METHODS OF TABULATION.

The population census of 1910, like that of 1900, will be tabulated by the use of punched cards. Every person in the United States is given a card on which the facts with regard to sex, race, age, birthplace, birthplace of parents, and the like are indicated by the punching of appropriate holes. The number of persons possessing each specific characteristic or combination of characteristics which it is desired to show in the final tables is then counted by means of electrical tabulating machinery, electrical contacts being made through the holes punched in the cards.

The punching machines to be used at the present census differ very radically from those used before, and will, it is believed, not only increase the rapidity of the work, but tend to reduce the number of errors on the part of the clerks doing the punching. With the old punching machine, if an error was made in a single item,—even though it might be the last item to be punched on the card,—the entire card had to be destroyed.

This consumed time, and also resulted in a temptation to the operator to let the error go uncorrected. With the machines now to be used, no hole is punched in the card until the keys for all the facts to be punched have been set, and, if the operator makes a mistake by depressing the wrong key, he can correct it before the card is punched. It was not found possible at the last census to check all of the cards back to the schedules, and it will probably not be feasible to do so at this census. Part of the cards punched by each operator are selected at random and compared back, and, if any appreciable percentage of error is discovered in those thus compared, the other cards punched by the same operator are likewise compared.

The tabulating machines to be used at the present census will likewise result, it is believed, in a material increase of rapidity and reduction of errors. This is principally brought about by the fact that the results of the count for each unit of area are automatically printed, whereas formerly they were registered on dials from which readings had to be taken and recorded by hand. The reading of these dials took a large amount of time, during which the machine was idle, and inaccurate readings were not uncommon.

THE MARGIN OF ERROR.

Turning now to the more important subject of the means of securing accuracy in the original census returns collected in the field, it is self-evident that the entire value of the census depends on the securing of approximate accuracy in the original returns. Absolute accuracy is out of the question, and, in fact, a small margin of error does not seriously affect the value of the statistics; but any considerable margin of error practically destroys their value. No degree of accuracy in tabulating and no degree of skill and judgment in analyzing statistics can give value to data which were incorrect in the first place.

It has too often been a vice of statisticians to present to the public tables purporting to show all sorts of important facts without due consideration of their truthfulness. The general

public who use the statistics—in fact, even the trained statisticians who use them—have in most cases no means of discovering the inaccuracy of such statistics and go on using them in misguided confidence. The compiler of statistics has often been, unconsciously perhaps, careless as to their accuracy because of the lack of any possibility of detection. The man who has charge of the collection of statistical data ought himself to be the severe and uncompromising critic of those data. He alone has approximately adequate means of judging the degree of accuracy which has been secured; and it is his duty, having done all that is possible to eliminate error, to inform the public fully and frankly of the extent to which error presumably still persists. So far from taking advantage of the fact that others cannot discover the errors which are hidden away in imposing-looking totals, he should from that very fact recognize the more clearly his own duty to explain just how much or how little the statistics may be trusted.

This does not mean, of course, that the statistician who knows that there are certain errors in his figures should straightway declare them of no value. Statistics on certain subjects may be of very little value unless almost absolute accuracy is secured, but there are many subjects as to which close approximations to the truth are almost as valuable as the exact truth itself. It is the mark of the competent statistician to be able to decide approximately what the margin of error actually is, and also to what extent the error vitiates the results. As Josh Billings said, "It is better not to know so much than to know too many things what ain't so."

At the census of 1900 and during the so-called intercensal period since that time the Census Bureau has done a great deal in the way of criticising its own statistics in the manner I have suggested; but I doubt whether it has yet been sufficiently emphatic in cautioning the public with respect to the existence of unavoidable errors. As one means of expressing the approximate character of the data, I think it desirable to express all very large totals of manufacturing and agricultural statistics in millions, and, in the case of the smaller figures

which appear in the statistics for individual localities and industries, to express the results in thousands.

To criticise statistics, however, is easy: the difficult task is to improve them. The Census Bureau will have done part of its duty to the public if it gives warning regarding the margin of error in the statistics it publishes, but it is far more important that it should reduce that margin of error.

METHOD OF SELECTING FIELD FORCE.

There are two means to this end. The first and more difficult is to secure better men to collect the statistics: the second is to simplify and clarify the inquiries.

As you are aware, the statistics of population and of agriculture are collected by a different force from that employed in gathering the statistics of manufactures. The population and agricultural data are secured by enumerators, of whom there will be about sixty-five thousand at the present census, they in turn being appointed by the supervisors, of whom there are about three hundred and thirty. The difficulty of securing competent and faithful enumerators is very great. The length of service is short, fifteen days in the cities and thirty days in the country districts. The period is thus too short to justify a man who has a good job in quitting it, while, on the other hand, it is too long in most cases to enable such men to get leave from their regular work to take the census. Moreover, the pay is small, averaging perhaps \$3 per day in the country districts and a trifle more in the cities,—practically the pay of ordinary mechanics. Most of those who seek, from financial motives, to be enumerators are men who are able to command only moderate pay in their occupations, while many of them are men who cannot command regular employment and who are looking for odd jobs.

Consideration has been given by the census authorities from time to time to the plan pursued in Germany and some other European countries, by which the census is taken chiefly or wholly by men serving without pay, who either volunteer

their services from patriotic motives or who are required to act. I very much doubt whether conditions in this country are ripe for such a scheme. At any rate, nothing of this sort can be done at the present census. It may, however, be hoped that to some slight extent, and possibly to a considerable extent, men can be induced to accept the position of enumerator from interest in the work rather than for the compensation involved. I hope that a considerable number of the colleges and universities of the country may see fit to give leave of absence to their students for the short time required to do this work of enumeration. It is, however, usually desirable that enumerators should actually live in the districts where they work, and there are multitudes of districts where no college students reside or where such students are in institutions hundreds or thousands of miles from their homes. Another class who can render good service as enumerators are school-teachers, but, with the enumeration taking place in April and May instead of June as formerly, few school-teachers can be spared from their duties to take the census.

The primary responsibility for securing efficient enumerators must rest with the supervisors of the census. It has been suggested from time to time that more efficient enumerators might be secured by competitive civil service examination. The difficulty with such an examination is the expense and delay involved. It is probable that for the sixty-five thousand places there would be several hundred thousand candidates, and the grading of their papers would require a large force for a long time. At some future census this plan might be worth a trial, but it can scarcely be attempted at the present census within the limits of time and appropriations set by law.

The Census Bureau does, of course, undertake to protect itself against such obviously incompetent enumerators as the supervisors, through political influence or through oversight, may happen to choose. At the last census the enumerators recommended by the supervisors were all subjected to a test examination, and the same policy will be pursued this time.

About one-sixth of the candidates selected by the supervisors were rejected as the result of this test in 1900.

I hope and believe that the supervisors at the present census are, on the whole, a higher type of men than those at any preceding census. The compensation offered to supervisors is somewhat more than ever before, but it is not really an adequate remuneration for men of the character needed. I believe that a very considerable proportion of the supervisors who have been appointed are men who in their regular occupations or professions are able to earn much more than the supervisors' pay, and who have accepted the positions because of the honor and responsibility involved or from patriotic motives. There has, however, been no new departure with respect to the general method of selecting supervisors, save only that in most of the large cities, selections have been made independently of political recommendations.

It may not be inappropriate here to explain the reason why so-called political recommendations must be sought in the appointment of supervisors in most of the districts. The supervisor, in order to do his work properly, must be a resident of the district over which he has charge. The position is not one which can be filled by civil service examination. A supervisor should be a man of executive ability, such as no examination can test, and he should be a man well known in his community. Indeed, men of the type desired would not in most instances be willing to submit themselves to a civil service examination. Neither the Director of the Census, his superior officer, the Secretary of Commerce and Labor, nor the President, can possibly have personal acquaintance throughout the country with men suitable to fill these positions, nor even with men, outside of political positions, whose advice they can seek. The representative of the district in Congress or the party leaders in the district have the necessary knowledge of local conditions and local men, and it is not only natural, but practically necessary, as a matter of good administration, that they should be asked to make recommendations for positions of this character.

Fortunately, members of Congress and party leaders are coming more and more to appreciate the importance of accurate census statistics. The spoils idea of appointments is growing constantly less dominant. The Director of the Census has done everything possible to impress upon those whose opinions were asked regarding the supervisorships the importance of the work and the necessity of having men of marked executive ability and of absolute integrity. The information furnished by members of Congress and party leaders regarding the candidates whom they have recommended has been supplemented by full personal statements required from each candidate, and in most cases by numerous letters of indorsement from business and professional men.

In the large cities the administration is evidently less dependent than in the country districts upon members of Congress and party leaders for information regarding available material for such positions as that of supervisor of the census, and the President and the Secretary of Commerce and Labor have joined with the Director of the Census in establishing the policy of making selections, wherever the information on which to act was available, without depending on the recommendations of political leaders.

The work of collecting statistics of manufactures and mining is in some respects even more difficult than that of collecting population and agricultural statistics. The number of employees required, however, is much more limited, and consequently it is possible to employ more elaborate methods of selecting them. The manufactures and mining statistics are practically all collected by men known as special agents. These are appointed by the Director, and the law does not require any examination, but it is my intention, nevertheless, to make the appointments as the result of competitive examination, held on November 3, from which, however, men who have had previous successful experience in field work for the Census Bureau will be excused, as well as men who have successfully passed the somewhat similar examination for the position of special agent in the Bureau of Corporations. It is evident that an ordinary civil

service examination, with its tests merely of what a man knows, is not adequate for the selection of men to do the responsible and largely independent work of visiting manufacturing and mining establishments to secure schedules from them. Consequently, following a precedent set by the Bureau of Corporations and to some extent employed also in other more advanced scientific civil service examinations, the examination for special agents consisted in part of the presentation of evidence regarding the applicant's previous education and experience, while the remainder of the examination was a very practical test of his ability to fill out a manufactures schedule. For those who are to do the simpler field work, this test was little more than reproducing on a schedule a set of facts which have been stated in narrative form, but, for the agents who are to visit the more important establishments or who are to have charge of other agents, the test consisted of the filling of a schedule from somewhat complicated details in a hypothetical balance sheet, income account, and pay-roll. Moreover, not being bound by any legal requirement to take the man with the highest rating first, the appointing officers of the Bureau will be able to give proper attention to such matters as personal address and tactfulness, which cannot be tested by any examination. We hope to secure as special agents largely young college and university men with some training in economics and statistics, or men who have been book-keepers of the more advanced type in manufacturing establishments or who have had other direct business experience.

PREPARATION OF SCHEDULES.

The form of the schedules on which census statistics are collected has an extremely important bearing upon the accuracy of the results obtained. In the drafting of a schedule, the first consideration is naturally what information it is desired to secure, but it is equally important to consider how far it is possible to obtain information accurately. There are always abundant suggestions from people interested in different eco-

nomie and social problems as to points which ought to be included in the schedules, and there is comparatively little danger that a statistician in public office will neglect to make inquiries merely because he does not know that the information would be of utility to the public. There are not so many people, however, who are well informed as to the difficulties of securing statistical facts; and one of the most important tasks of the statistician is to determine what facts can be secured with accuracy by the means which he has at his disposal. Not only are some inquiries, which, if answered correctly, would furnish very valuable information, in themselves quite incapable of correct answer under existing conditions, but the multiplication of inquiries which separately are quite capable of accurate answer tends to lessen the accuracy of the replies to all of them. A schedule may, in other words, easily be overloaded. The enumerator or special agent collecting the statistics becomes discouraged if too much is asked of him, and the person to whom he addresses his inquiries becomes still more discouraged, not to say annoyed and confused.

Every reduction in the number of inquiries contained in a census schedule tends to greater accuracy in the returns, except of course in those cases where such reduction in the number of inquiries injures the clearness of the schedule. Some details in schedules, themselves comparatively unimportant, are often necessary in order to make clear what is intended to be included in a total.

This demand for reduction of the number of inquiries and simplification of them, in the interest of accuracy in the returns themselves, is in some cases opposed by the likewise important demand for details which will permit an accurate analysis and interpretation of the statistics. In other words, the lower form of accuracy sometimes stands opposed to the higher form, which seeks the true spirit of the phenomena investigated. For example, take manufactures statistics. In many industries the entire technical and economic conditions are rapidly changing, and broad general interrogatories, even though answered with entire accuracy, give results

which are not comparable with those of preceding censuses because of such changes in conditions. One instance of this character happens to have come to my personal attention recently. The schedules for the petroleum industry call for the value of the different kinds of oils produced, including the containers in which they are shipped from the refineries. Twenty or thirty years ago nearly all oil was shipped from refineries in barrels or other small containers, the value of which represented a large fraction of the total value of the product. At the present time the larger part of the products of refining is handled in bulk, without containers. A comparison of the average value computed by dividing the number of gallons into the total value of the product, including containers, from one census period to another, is, therefore, highly misleading. The higher form of statistical accuracy would be secured only by the insertion of somewhat burdensome questions, designed to separate the value of the product contained from that of the containers.

It is evident, therefore, that it is an exceedingly important and difficult task to frame a schedule which shall combine simplicity with that completeness which will permit correct interpretation.

The manufactures, mining, and agricultural schedules are necessarily the most complicated which the Census Office employs. The office has spent a very large amount of effort during the present summer in studying these schedules, and has called to its assistance a number of economists and statisticians from the universities, as well as men connected with the practical work of the Department of Agriculture and the Geological Survey and men actively engaged in business. I hope that we are succeeding in materially reducing the burden upon the enumerators and the special agents, while at the same time cutting out few inquiries of material value and adding some which will make the results more intelligible.

To illustrate what has been undertaken, I will call attention to two very material changes which have been made in the schedule of manufactures. At the censuses of 1900 and 1905

that schedule called for the average number of men, the average number of women, and the average number of children under sixteen employed during each month in each establishment. To answer this interrogatory with strict accuracy would have required the special agent or the manufacturer to go in detail through every pay-roll of the year, usually either fifty-two or twenty-six in number, counting the number of men, women, and children separately on each,—the segregation of those under sixteen involving peculiar difficulty,—and averaging the account for each month. To do this and at the same time to answer the inquiry regarding classified wages to which I will shortly refer would, in my opinion, have required ten times as much time as to answer all of the other inquiries on the schedule put together. As a matter of fact, practically none of the returns were, I am convinced, based on analysis of the pay-rolls. They were in nearly all cases mere estimates made more or less off-hand by the manufacturer or his book-keepers, and, as many months had elapsed before the estimates were made, there is every reason to believe that they were often very wide of the mark.

The schedule as it has been revised for the present census calls for the number of men, women, and children employed during one specific week only, and for the total number employed, without distinction of age or sex, on the fifteenth day of each month. The relative extent to which women and children are employed will be ascertained approximately from the figures for the selected week. If the total number of employees for one day of each month is returned with approximate accuracy, then the average of these twelve dates will unquestionably show very closely the true average number of employees during the year. We hope to be able to induce special agents and manufacturers in a large proportion of cases to answer this revised interrogatory from actual pay-rolls, and, if so, the greater accuracy will far outweigh any apparent sacrifice in the amount of information obtained.

At the last census of manufactures a question was included in the schedule which called for the number of employees classi-

fied according to their earnings for one week of the year, separating men, women, and children under sixteen. This is a question which, if correctly answered, would furnish information of very great value. We have become convinced, however, that for many establishments correct answers cannot be obtained, and that for other establishments the amount of effort required to obtain correct answers is so great as scarcely to justify the expense, while also tending to injure the accuracy of all the data called for on the schedule. Strictly speaking, this inquiry falls within the field of the Bureau of Labor rather than that of the Census Bureau. It may be, however, that at another census, in order to take advantage of the fact that census agents are to visit every manufacturing establishment, it would be desirable to ask the authority of Congress to provide a special schedule covering classified wages, and an extra appropriation to cover the expense of getting it properly filled from actual pay-rolls. It would not be essential that returns of classified wages be secured from every manufacturing establishment. If such returns could be secured accurately for even 50 per cent. of the employees, they would be of very great value, and the agents could be specifically instructed to accept no estimates whatever.

What has just been said regarding these two changes in the manufactures schedule will illustrate what I said before with regard to the increase in accuracy which can be secured by simplification of the schedules. The schedule of manufactures hitherto has been overloaded. Since special agents and the manufacturers who filled them were practically forced in many cases to make estimates in replying to the interrogatories regarding the average number of employees and classified wages, they were tempted to regard estimates as sufficient for the replies to all the interrogatories of the schedule. The intellectual integrity of the special agents was undermined by requiring of them work which they knew could not be done accurately within the time which they were allowed.

ANALYSIS AND INTERPRETATION OF STATISTICS.

It is a commonplace of statistical science that the mere presentation of figures has comparatively little value without analysis and interpretation.

The statistician owes to the public the duty of properly analyzing and interpreting his material, not simply in order that the public may get the full value of the results, but, what is more important, in order that false and misleading interpretations may be forestalled and prevented. Whether the untruthfulness has been due to intentional misrepresentation or to ignorance, census statistics have probably been made the basis of more fundamentally untruthful speeches and articles than any other set of facts. The reports of the Census Bureau in the past have contained many warnings against such misleading use of their contents, but such warnings are all too often disregarded. Liars and fools—to use perhaps exaggerated expressions—will continue to abuse census statistics, whatever the Government may do to prevent it. We shall attempt at the present census, however, to make the warnings against such use of the figures even more numerous and more emphatic than in the past, in order that the man of ordinary intelligence may in general escape the pitfalls. Too often the warning has been posted in an inconspicuous place, hidden away in some long page of text, when it should properly have been presented in the most conspicuous place in the text, or often in the headings of the tables themselves, since most people, even those of considerable economic training, usually pay little attention to the text and assume that the tables mean what on their face they purport to mean. These warnings should relate not merely to unwarranted conclusions from the figures, but also, where necessary, should caution the reader against assuming a degree of accuracy in the statistics which does not exist. One of the most important duties of the census statistician is, as I stated at the beginning, to discuss frankly and clearly the margin of error in the returns.

In addition to increasing the frequency and the emphasis

of the warnings against improper use of the census statistics, it will be desirable, in my opinion, to extend somewhat further than hitherto the analysis and interpretation of the statistics, at least in certain directions. A desirable feature of this increased analysis will be the publication of additional monographs dealing with particular economic and social problems. Many people have little interest in census statistics in general, but are profoundly interested in the data regarding some particular subject, and such data should be available for their use in separate form so far as possible. You will recall, for example, the exceedingly able monograph prepared by Dr. Willcox on the basis of the census of 1900 and dealing with the negro. We contemplate another monograph on this subject at the present census, and also similar monographs dealing with the foreign-born, with the family, with occupations, and perhaps with other similar subjects connected with the population statistics. Monographs dealing with particular branches of agriculture are also contemplated. The practice of presenting the statistics of the leading manufacturing and mining industries in monographic form has already been pursued quite generally at previous censuses.

Proper analysis and interpretation of the census statistics will call for the employment of a considerable number of statistical experts in addition to those on the permanent roll of the census. A considerable proportion of the tabular and text analysis and interpretation of the statistics at the previous censuses has been committed to men of comparatively little economic and statistical or business training and experience, although beyond question much of the work has been done by highly competent men. We hope to be able to enlist the service, for periods ranging from a few months to a year or two, of a considerable number of expert special agents to aid in the work of analyzing and interpreting the returns. Hitherto the limit of salary for temporary expert service of this sort has been altogether inadequate, \$6 per day. In July of this year Congress passed a bill authorizing the payment of not to exceed \$8 per day to twenty expert special agents. The Di-

rector had asked that the limit of pay be fixed at \$10, and it is possible that Congress will this winter be again urged to establish that rate. Even \$10 per day is but moderate compensation to offer to men who possess the necessary qualifications for this work, most of whom are already earning at least that much in permanent positions.

It is not the intention to employ exclusively men who have had university training in economics and statistics in this advanced work of analyzing and interpreting the census material. Particularly in the case of the manufacturing, mining, and agricultural statistics, it will be desirable to obtain the service of men of practical business experience. This policy has been pursued, in fact, to a considerable extent at previous censuses. I believe, however, that in some cases the economy as well as the scientific value of this work has been impaired by having too much of it done by men who were not actually present in Washington, but who gave only such time as they could spare from their regular professions or occupations to the work at their own homes, coming only occasionally to Washington for consultation. This practice has tended to undue lack of uniformity in methods, and has placed too great responsibility on single individuals. While specialization has its great advantages, it should be combined with consultation with others working on kindred topics.

The general policy of insisting that, for the most part at least, the expert special agents who analyze the statistics and prepare the text of the reports shall be present in Washington at least the greater part of the time, will in some cases exclude practical business men such as have formerly been employed for that purpose, because of their inability to give up, even temporarily, their regular duties. We shall, however, employ such men as consulting experts, having them come occasionally to Washington or sending the expert special agents who are assigned to particular tasks to consult with them at their homes. We believe that the undivided attention of men of high capacity and of general statistical and economic training, even though they may previously have had little direct experience in the

particular subject intrusted to their charge, will enable them in a comparatively short space of time to become sufficiently expert to handle the statistics even more satisfactorily than can be done by men of more practical experience who are not personally present and can give only a part of their time.

A STATISTICAL PILGRIMAGE.

BY CRESSY L. WILBUR, CHIEF STATISTICIAN, DIVISION OF VITAL STATISTICS,
BUREAU OF THE CENSUS.

It is usually expedient to commence at the beginning of a story or book in order to understand its contents, although it is not unusual for readers to turn to the last chapter to see how the story comes out.

I presume that you are especially interested in the recent statistical pilgrimage, if I may so call it, which I made as a representative of the Bureau of the Census to the International Commission of Revision of the Classification of Causes of Death at Paris last July. Nevertheless, if you will pardon me, I shall first say a few words about the first statistical pilgrimage that I ever undertook, because that is really the beginning of the last one.

My first journey abroad in search of statistical light was about fifteen years ago. I was then the chief of the Division of Vital Statistics of the State of Michigan, and had only been in the work of registration since Jan. 1, 1893. I appreciated the very serious defects of the old Michigan law, and naturally, as a physician, my attention was called to the very unsatisfactory character of the statistical classification of causes of death which had been in use in Michigan since the first operation of the law in 1867.

In a discussion of the subject with my friend Dr. Henry B. Baker, the veteran and honored secretary, at that time, and organizer of the Michigan State Board of Health, he suggested the desirability of my attendance upon the annual session of the American Public Health Association, of which he is one of the ex-presidents. I felt the necessity for consultation with other workers in vital statistics, and accordingly I determined to attend the meeting, which was held at Montreal, Province of Quebec. With the temerity characteristic of the medical

man who has just had his attention called to mortality statistics, I took with me a paper on the subject of a New Classification of Causes of Death, which I had the grace to entitle "A Provisional Arrangement."

At this meeting it was my great good fortune to meet, among many eminent leaders of sanitation and vital statistics in the United States, Dr. Charles A. Lindsley, secretary of the State Board of Health of Connecticut for many years, and of whom it was said that he could hear a death occur in any part of the state and detect whether it was registered or not; Dr. Benjamin Lee, former secretary of the State Board of Health of Pennsylvania and now honored in an advisory capacity with the Health Department of that state; Dr. J. N. McCormack and Dr. William Bailey, of Kentucky; Dr. C. O. Probst, of Ohio, now secretary of the Association, and whose active interest in vital statistics greatly promoted the passage of the excellent law which enabled Ohio to be included in the registration area during the present year; Dr. Bryce, the Provincial Health Officer and Registrar of the neighboring province of Ontario; and, eminent among them all from his high attainments and great practical knowledge of registration methods, Dr. Samuel W. Abbott, then secretary of the State Board of Health of Massachusetts. I well remember when Dr. Abbott and I sat on a bench in the park before the Windsor Hotel at Montreal and talked over the principles of the new classification which I had brought down for the consideration of the veteran registration officials. I first learned from him—he was then chairman of the Committee on Vital Statistics of the Association, and made a special report to the meeting on the subject—that a proposition for an International Classification of Causes of Death had been made by Dr. Jacques Bertillon, of Paris, at the meeting of the International Institute of Statistics, which was held at Chicago during the World's Fair of the previous year. I had been in Chicago at the time of the meeting of the International Statistical Institute, but, having been in the statistical service only a short time, I was quite uninformed as to the existence of such a body. I was

not to blame, and there are many young men placed in charge of registration work in the United States to-day who are quite ignorant that there is such an organization as the American Public Health Association, with its Section on Vital Statistics, or the American Statistical Association, and who therefore feel quite free to devise new forms and methods according to their own inclinations and to produce statistical reports which are chiefly remarkable for the absence of all possible comparability with any other reports. I am not saying that my new classification, which you will find in the Michigan reports for several years, beginning with 1892, was not a good one, and it was no objection to it at that time that it was peculiar to Michigan; for, as a matter of fact, there was no agreement between any two states or between any two countries of the world in the forms of presentation of mortality statistics relating to causes of death.

The situation was deplorable in this respect, because it is absolutely necessary to compare the statistics of causes of death of one country, state, or city with those of another, in order to know their relative condition with respect to sanitation and the proper enforcement of laws for the preservation of the public health. The whole science and practice of modern hygiene of the nation, state, and city, is based upon vital statistics; and, when the figures by which its progress is measured cannot be compared, the result is unfortunate for the full success of the methods employed for the protection of the lives of the people.

The visit to Montreal and the intercourse with representatives from other provinces and states of Canada, Mexico, and the United States, led me to take a broader view of the situation, and a little later, after Dr. Abbott's resignation from the chairmanship of the Association's committee and my appointment, at his request, to the position, I recommended, at the meeting at Philadelphia in 1897, the use of the Bertillon classification by all of the countries represented in the Association and by their states, provinces, and cities. The recommendation met with some opposition, and was not finally passed

until 1898. It contained also a proposition that there should be a revision of the classification as reported at Chicago in 1893, so that it would be more acceptable in some respects for general use, beginning with the year 1900, the date upon which the Federal census was to be taken, and a decennial revision thereafter. This recommendation was cordially approved by the International Statistical Institute at Christiania in 1899, and the First International Commission was held at Paris in August, 1900.

The United States Bureau of the Census was not on a permanent basis at the time when these events occurred, and consequently took no part in the general adoption of the classification by the states and cities of this country. As soon, however, as the work of compilation began, the chief statistician of the census for vital statistics, Mr. William A. King, adopted the International Classification as revised at Paris in 1900, and used it for the mortality statistics of the calendar year 1900, thus making it, as I believe, the first great mortality report in the world to be compiled according to the revised classification, which did not go into effect generally until 1901.

The Census Office was not represented in the International Commission of 1900, nor any of the registration officials of the states and cities whose co-operation in the adoption of the International Classification had rendered possible, in the language of Dr. Bertillon himself, "the accomplishment of that great end, international uniformity, desired for fifty years by European statisticians, and which had not been possible until the action of the American Public Health Association at Ottawa in 1898." National committees or commissions, however, were formed to represent the three countries, one for Canada, one for Mexico, and one for the United States. The American Commission consisted of Dr. Samuel W. Abbott, of Massachusetts, Dr. A. G. Young of Maine, and myself, who acted as secretary, and published in the *Michigan Monthly Bulletin of Vital Statistics* from month to month many recommendations and suggestions from registration officials in regard to the work of revision. In spite of this, however, we had abso-

lutely no official recognition, and I did not even know of the date of the meeting of the commission or that it had been held until after its work had been completed. I can well remember, as a state registration official, the blank feeling of disappointment that came over us when we found that we were absolutely ignored in the official revision which had been brought about through the recommendations of our Association.

I am very glad to say that conditions were different this year, and that the Bureau of the Census, now permanently organized, has consistently urged as an essential point that the United States should be represented in the Second Decennial Commission of Revision by delegates chosen from the registration officials of the United States and from the medical profession, upon whom the Federal Government is entirely dependent for the primary data relating to causes of death; and that Congress has recognized for the first time in the history of the United States and after many years of acceptance, practically gratuitously, of the statistics obtained from registration sources, that the men who furnish the material for the vital statistics of the United States should be officially recognized in the important task of deciding how such data can be made most useful and acceptable for sanitary workers in this country.

That this was in fact carried out is due to the prompt action taken, immediately after his installation, by the Director of the Census, Hon. E. Dana Durand. My former chief, Hon. S. N. D. North, was earnestly interested in the adequate representation of the Bureau of the Census in this International Commission. Items were included for this purpose in legislation before Congress, but for various reasons in connection with the long-deferred action upon the general census bills no legislation was obtained. This representation was *vital* to the census. It could not hope to retain its prestige as a leader in the adoption of uniform methods of classification and as a guide to the registration states and cities unless it could be represented, as were the registration offices of other countries, in a commission whose action was to determine

the practical compilation of statistics for the United States for the next ten years. I felt this to be so urgently needful that only a day or two after my first introduction to Dr. Durand I presented the matter to him, and after brief consideration he directed me and the other members of the Census Commission, Dr. Wilmer R. Batt, State Registrar of Pennsylvania and chairman of the Committee on Vital Statistics of the American Public Health Association, and Dr. Frank P. Foster of New York, chairman of the Committee on Nomenclature of the American Medical Association, to proceed to Paris and attend the meeting. Of course, Dr. Durand's action would not have been possible without the support of those who felt that assurance could be safely promised for the necessary legislation. Thanks should be rendered especially to Hon. Charles Nagel, Secretary of the Department of Commerce and Labor of which the census constitutes a bureau, Hon. Elihu Root, senator from New York, who as Secretary of State had recommended the proper representation of the United States, and Hon. James A. Tawney, chairman of the House Appropriations Committee. The necessary authorization was included in Public Act No. 1, approved June 29, 1909, or only two days before the beginning of the session. Dr. Batt and myself, Dr. Foster unfortunately having been unable at the last moment to sail, saw the shores of France on the morning of June 29, and we sat in the morning session of the commission on July 1 at the Ministry of the Interior not far from the Élysée Palace in Paris.

When we reached Paris on the afternoon of June 29, after a very pleasant but uneventful voyage, during which we had the privilege of consulting with Professor William H. Welch, of Johns Hopkins University, Baltimore, president-elect of the American Medical Association, our first business was to ascertain our position with respect to credentials for the commission. We were utterly without information as to what had been done since we left Washington, and were not a little anxious in regard to our position, as the members of our commission had not received those official credentials

which are so necessary in the somewhat formal procedures abroad. We accordingly sought the aid and counsel of Hon. Henry White, ambassador of the United States, and, after his first natural feeling of consternation was over at the apparition of two Americans who dropped in casually and informed him that they desired to participate as official delegates of the United States in an International Commission called by the French Government to meet on the following day, he gave us the most cordial and effective assistance.

By cablegram between the ambassador and State Department at Washington and from myself to the Director of the Census, matters were at once adjusted, by the prompt action of the French Foreign Office, so that on the following day we sat in the International Commission as fully accredited official delegates of the United States. I also found in Paris Professor Willcox, of Cornell University, who had some time before been accredited to the commission by the Department of State; Surgeon F. L. Pleadwell, special delegate of the Navy Department; and Surgeon-General H. D. Geddings, representing the United States Public Health and Marine-Hospital Service. Dr. William H. Guilfoy, registrar of records of Greater New York, who was sent as a special delegate by the Health Department of that city, and who was duly included with Dr. Batt and myself as official delegates of the United States, reached Paris on the evening of June 30, and met with the American delegates on the same evening at Dr. Pleadwell's hotel, where we planned our action for the following day.

In regard to Dr. Guilfoy's appointment by the Health Department of the city of New York, which was made at a time when it seemed almost certain that the registration officials of the United States would have no representatives at Paris, I feel that the most cordial thanks are due to the city sanitary authorities for thus delegating him.

It may be of interest to you to know that Dr. Guilfoy, as registrar of records of Greater New York, annually compiles more deaths under the International Classification than are compiled for any other city in the world under any system.

The number of deaths in New York City for the year 1908, for example, was 72,995, while in London the deaths registered for the fifty-three weeks ended Jan. 2, 1909, numbered only 68,239, or 4,756 less. Of course, London has a somewhat larger population than New York (4,795,757 as compared with 4,338,322 for the middle of 1908), but the London death-rate is somewhat lower than that of New York, so that the total number of deaths, as stated, is greater than the number compiled in any other city in the world.

In the same way Dr. Batt, as State Registrar of Pennsylvania, annually compiles under the International Classification more deaths than any other state office in the United States, and probably more than any other office, not a national office, in the world. Although the total number of deaths for the State of New York somewhat exceeds the total number for Pennsylvania, the State Health Department at Albany does not make the compilation for four cities of that state,—Albany, Buffalo, Greater New York, and Yonkers,—so that the number of certificates actually received and compiled by the state office at Albany is much less than those received at Harrisburg for the State of Pennsylvania.

I shall not go into detail as to what was done in regard to the changes in the Classification at Paris. The preliminary report of the Census Commission and the revised list of titles will be found in Census Bulletin No. 104, which will be published in a very few days and copies of which will be sent to all of the registration officials of the United States and to the members of this Association. A new Manual of Classification will be prepared for the use of the registration offices of the United States as soon as the detailed results of the revision are available, and an effort will be made to bring the revised classification to the attention of every physician and local registrar in the country as an aid to the proper reporting of causes of death.

If the Census Commission had accomplished absolutely nothing in the way of practical reform, it would have been well worth sending, in order that the country should occupy

the place to which it is entitled in the councils of the nations which employ this classification; but, as a matter of fact, very much was accomplished.

Dr. Foster, as chairman of the American Medical Association's Committee, and Dr. Batt, as chairman of the Committee of the American Public Health Association, have been engaged for over a year in co-operation with the Bureau of the Census and with committees appointed by many national medical organizations devoted to special branches of medicine, upon the question of the proper classification and nomenclature of diseases with special reference to the improvements to be made in the International Classification at the recent revision. Meetings were held by these committees at Philadelphia, New York, and Washington, and important suggestions were formulated which were duly transmitted to the Secretary-General, Dr. Bertillon, and were laid before the commission in the special book prepared for its use. A very considerable proportion of these were adopted by the International Commission. Perhaps the most important of all the measures especially recommended by the United States was the improvement in the principle of the statistical classification of deaths from violence. Dr. Bertillon, Dr. Livi, of Italy, and myself were appointed a special committee of the Commission to adjust this portion of the Classification. I believe that the list as revised will be much more acceptable to American registrars, and that it will give the information in regard to the industrial causes of mortality in a more satisfactory way than any classification previously prepared. Of course, all of the recommendations of the American delegates could not be adopted. There were twenty-three countries represented in the International Commission, and conservatism is a characteristic of European officials, and especially of European statisticians. It is perfectly right that this should be so, because it creates endless confusion when many changes are made in an established system of compilation. Furthermore, it is hardly to be expected that a country like the United States, whose registration officials had never before joined in an international congress and whose

statistics relate to only about one-half of the population of the United States, should be able to prevail against the established views of the representatives of countries where complete and comprehensive vital statistics have been published for a long series of years. Nevertheless, the fullest consideration was given to the American propositions, and the utmost courtesy and harmony prevailed. I feel that the American delegates owe profound thanks to the Secretary-General, Dr. Bertillon, and to the French Government, and that American registrars should loyally abide by the recommendations adopted, and use the International Classification without any modifications or changes, except such as are entirely permissible under its constitution, for the next ten years.

We start out now at the beginning of a new census decade with the revised classification of causes of death, in which American registration officials and American physicians have had their say; a revised standard certificate of death, which will be adopted by the American Public Health Association at Richmond next month, I feel entirely confident, and put into effect for all of the registration area, beginning Jan. 1, 1910; and with new rules and instructions recently formulated by the Director of the Census, and promulgated to all reporting offices for the purpose of obtaining more complete and correct transcripts of the deaths now registered.

In regard to the last I may now say a word. The inspiration for this effort came from my observation of the methods employed in the national registration offices of France and England. The Bureau of General Statistics under M. Lucien March receives individual returns of deaths from all parts of France in a manner similar to that in which we receive transcripts of deaths from the registration area of the United States. Prior to 1906 such returns were not made to the central bureau, but the statistics of France were based upon compilations made in the departments. At the present time in France, as in the United States since 1900, the national mortality statistics are based upon compilations made at the central office, and it was therefore of special interest to see the manner in

which these returns were received from the local registrars and handled at Paris. We have yet very much to learn with respect to care and precision in this matter in the United States. Our difficulties arise partly from the fact that the returns made to the Bureau of the Census are entirely for statistical purposes, and are not official legal records such as pertain to a national registration office. Nevertheless, we can make great improvements, and I believe that the circular of instructions recently issued by the Director and the monthly accounting for all returns, with prompt correction of discrepancies between the numbers reported by the States and cities and the transcripts received by the Bureau of the Census, will tend to eliminate, I hope completely, the differences that have occurred between the Federal and local compilations and form a basis of standard tables for the calendar year corresponding to the census of 1910, and for subsequent years.

The same extreme care in the reception and correction of returns, and especially the correction of personal particulars relating to the individual, was apparent in the Registrar-General's office of England, through which I was shown, with the fullest possible explanation of all details of administration and classification, by Dr. John Tatham, who has very lately retired as the Medical Superintendent. Here, again, may I note the immense value of personal contact with the leading registration officials of other countries. Dr. Tatham supplied to me, for the use of the Bureau of the Census, a copy of his personal instructions in regard to the compilation of joint causes of death,—something which has never heretofore been permitted to go out of the Registrar-General's office. As in the reforms in this country, which, I think, have been possible only through the meeting together of registration officials in the American Public Health Association, so, I believe, future reforms in international statistics, and the accession of Germany, England, and other countries which are not yet users of the International Classification, may be brought about through the personal acquaintance and confidence that result from international meetings. I am especially hopeful that it will be

possible for the Third Revision of the International Classification to be called by the American Government to meet in Washington in 1919. As the beginning to this desirable end, I hope that the American Statistical Association will unite with the American Public Health Association in a joint meeting at Washington next year at the time of the International Congress on Hygiene and Demography, when the most eminent sanitarians and vital statisticians of the world will be here.

A STUDY OF NEW ENGLAND MORTALITY.

BY HARRY A. RICHARDS.

The study of mortality tables has always disclosed interesting facts as to the life of a community. William Farr, the eminent English statistician, has set forth in many places in his reports the advantages of their use, and has constructed many valuable tables. Such tables and deductions from them have been made, indeed, in the other leading European countries. But in the United States adequate statistics on which to base them have been, until very recent years at least, wholly lacking. Some records of deaths and births, and of population, are to be found, however, in New England, extending back to the earliest times. I have attempted to make some use of these data, and to criticise my own results in such a way as to be sure of not proving too much. It is not without utility to prove that nothing can be proved, if no better result can be reached.

The prevalent notion is that conditions favoring longevity are increasing, and this is probably correct in respect of recent times. That it was so uniformly, from the settlement of New England, is certainly open to doubt. Professor Bailey, in his "Modern Social Conditions," says, after giving Wigglesworth's life-table for Massachusetts constructed in 1793 or thereabouts (see Table IV) and the Board of Health Table for Massachusetts constructed in 1897 (see Table II), "We see from this table that in the course of a century the expectation of life at birth has increased sixteen years for males and eighteen for females, assuming that the figures for males and females are identical at the earlier date." This sort of comparison is of doubtful value, for it does not take into account the fact that the two tables were constructed on entirely different principles. Wigglesworth himself knew the limitations of his work very well, and in fact made a correction for the

earlier ages of his table, which makes Professor Bailey's comparison inaccurate, even on the face of the tables, not regarding the difference in method. In my own investigation I have tried to keep such differences in mind and to discount them.

First, let us inquire as to the change in the force of mortality during the last half-century (see Table II). The table of 1897 and Elliott's table of 1855 were both constructed on the correct principle, comparing the actual deaths with the actual living population. A comparison of them is therefore permissible. This comparison discloses the fact that mortality has lessened most markedly in the years of infancy and childhood, and to a less degree in later life. The results are well stated in the Report of the State Board of Health for 1897. Table III presents the same facts, in the form of death-rates. These two tables are the only ones that can be considered finished products, based on adequate data. They seem to show an increasing expectation of life and a saving of many years of existence to the population.

The next preceding effort to make a historical study of mortality that I have found was Lemuel Shattuck's Essay on the Vital Statistics of Boston from 1810 to 1849 (see Table V). He says: "It has been repeatedly said that the great improvements in the science of medicine—in the nature and treatment of disease, and other causes, have increased the average longevity of mankind; that life is more valuable now than it formerly was; and that these improvements are constantly going on. The value of life is estimated by the number of years we live. A long life is more valuable than a short one. It is said to be improved in value when the various circumstances, which surround us, add to the number of years of existence, as compared with other causes, which have existed in other places or periods of time. No correct conclusion can be made in regard to such comparison, except by careful examination of the facts.

"This comparison . . . shows that, although the average value of life is greater now than during the last century, it is not so great as it was twenty years ago."

This is a clear and valuable statement of what investigations

of this kind can prove, and it is also valuable as an interpretation of the results he was able to get from the bills of mortality of Boston. These show a positive decrease in the expectation of life during the period of his observations. He accounted for this by overcrowding, by the prevalence of "luxury and effeminacy," and by the heavy infant mortality. At any rate, here was a time when a steady betterment of conditions conducing to longevity was not the rule.

The next table before this was Wigglesworth's, published in 1793, constructed from deaths alone, and used for many years in Massachusetts courts as an authority on American mortality. Data were also collected by President McKean, of Bowdoin College, which I have cast into a form of a mortality table (see Table VI).

The extant tables, then, carry us back about one hundred and twenty years or thereabouts. What was the change which took place during the century and a half before that, from the founding of the colonies in Massachusetts down to the time Wigglesworth wrote?

To answer this question, it would have been desirable to have complete lists of deaths each year, classified by age, and frequent and accurate censuses, also classified by ages, neither of which exist. The town records of Massachusetts, however, contain in many instances the age at death; and genealogies (usually based on the records or on deeds or letters) also contain the same information. From these two sources I have constructed three mortality tables (see Table I). The first table (column 1) is based on lives begun and ended in the seventeenth century; the second, on lives born in the seventeenth century; and the third, on lives born in the eighteenth. The method of treating these data was the one ordinarily used where no record of population is available. The quite unusually high expectation of life in infancy and for the years of life before fifteen, is fairly conclusive evidence that the larger part of the infant mortality was not recorded. This might have been expected. Above the age of fifteen, however, there is no reason to suppose an uneven omission of deaths at any particular age,

and the question then becomes this: Are the differences shown by a comparison of these tables with later ones due to a change in the force of mortality, or are they due to a change in age-constitution? Tables constructed according to Halley's method are subject to correction, according to the following scheme: If the population is stationary, the correction is zero; if the population is increasing, the expectation is too small, and must be increased; if decreasing, the expectation must be decreased. This is easily perceived to be true, for, if the population is increasing, there will be a disproportionate number of deaths at the young ages (the age-pyramid will bulge at the bottom), and this will shorten the expectation. Now New England's population was certainly increasing in the seventeenth and eighteenth centuries. Wigglesworth made a correction for this in his own table. The correction is indefinite for lack of statistics of population, but it would need to be made for both of the earlier centuries, and would tend even to increase the expectations given in columns 2 and 3. If this correction affected the table for the eighteenth and the seventeenth centuries in the same way, a comparison of them as they stand is permissible. This is reasonable on its face, and there is not much evidence to the contrary. It will be noted from Table VIII, where the order of the various expectations is given for all the tables discussed in this paper, that the expectation for the seventeenth century was greater than that for the eighteenth for every age from fifteen to forty: the order is reversed for ages forty to seventy, but the earlier century has again the advantage for the rest of life. What evidence can be gleaned from these tables, therefore, would seem to indicate a decrease rather than an increase in longevity from the seventeenth to the eighteenth century. What reason can be assigned for this? A statement in the Report of the Massachusetts Board of Health for 1897 is quite in point, although intended to apply to a later period: "The population of almost any one of the United States differs essentially from the more stationary populations of the old world in the fact that it is constantly being recruited by the addition of considerable numbers of immigrants at the healthy ages of life.

These additions constitute a selected class, not only on account of their age distribution, but also because many of the weaklings must be left behind, in consequence not only of their inability to become wage-earners, but on account . . . of the immigration laws." This was true at the early date for which these tables speak except the last clause. Possibly, therefore, after a hundred years or so the race was not quite so uniformly robust and hardy as it was during the early days. This is merely a tentative explanation.

For every age from fifteen to forty Wigglesworth's table—which was constructed on the same sort of data as mine—shows a lower expectation: from then on it is higher than my tables. This, again, does not indicate a marked increase in expectation: on its face, it indicates a decrease, but I am loath to insist on that interpretation. The changes in mortality during the later periods I have set forth above.

The net result, therefore, which seems derivable from this investigation is that during the last half-century longevity in Massachusetts, and probably in New England, has increased, that from 1793 to 1850 the increase is less certain, and from the seventeenth century to the eighteenth century what data we have point rather to a decrease than to anything else.

I will now give a brief statement of the materials and methods used in constructing my own tables, and try to meet certain objections thereto.

The town records of Massachusetts, as reprinted by the New England Historic-Genealogical Society, together with various family histories, furnished the material.

These town records of Massachusetts are very useful: the idea was originated by the society; and their value as a matter of historical record has been impressed upon the other New England States. Maine passed a law providing for similar work, but it was inoperative. New Hampshire is collecting the records of Concord. The records of some few Connecticut towns are in print. But beyond these there seems to be little prospect of such a work being done systematically for the whole of New England.

The society has in its possession the records of a considerable number of tombstones in Massachusetts, which have been copied by local antiquaries and genealogists into blank books provided for the purpose. These also furnished me some material, especially for the earlier century, and especially those of Copp's Hill and King's Chapel, Boston.

The method followed in manipulating these figures was the tabulation of the ages at death, and the computation from that of the average after-lifetime, or expectation.

Many of the difficulties usually encountered in life-table construction have been avoided, notably the adjustment of the infant mortality; for the records of infant mortality are so incomplete for this early period that almost no significance can be attached to them. Nor was it necessary to go through any adjustment of the population to the age-groups, for the population from which the deaths occurred is necessarily disregarded.

One objection to this method, and possibly a valid one, is that it is possible for a life to be repeated; that is, to be gathered from two different sources, and thus appear twice in the data, and receive twice its due weight in the computations. As to this point, however, it is worth noting that the Seventeen Offices Table, an English table, was based on policies which became claims rather than on lives that ended. Since one person might carry more than one policy, a life in this table could be repeated in the same way. The *Encyclopædia Britannica*, art. Insurance, says of this table: "The general agreement of the results with those derived from other data referring to persons and not to policies, seems to show, however, that the peculiarity referred to does not materially affect the accuracy of the table as an exponent of the value of assured life." This was probably true also in the case of these tables.

TABLE I.

EXPECTATION OF LIFE.*

Three life tables: (1) from lives begun and ended in the seventeenth century, (2) lives begun in the seventeenth century, (3) lives begun in the eighteenth century.

Age.	(1)	(2)	(3)
0	59.44	58.24	48.81
5	57.17	54.65	47.59
10	52.58	50.02	43.94
15	47.91	45.44	40.27
20	43.43	41.19	37.25
25	39.76	37.45	35.01
30	35.94	33.88	32.21
35	32.23	30.45	29.79
40	28.76	27.07	26.95
45	25.20	23.56	23.79
50	21.84	20.32	20.73
55	18.83	17.25	17.88
60	15.77	14.32	14.84
65	13.14	11.87	12.03
70	10.74	9.45	9.63
75	8.38	7.59	7.46
80	6.44	5.84	5.72
85	5.59	4.72	4.66
90	4.02	3.75	3.10
95	3.34	2.50	2.53
100 . . . . .	.86	.50	.90

* Column (1) is based on the records of 1,632 deaths, taken from Potter's "Concord Lives," and several genealogies; column (2) is based on the records of about 3,500 deaths from the Granary, King's Chapel, and Copp's Hill burying-grounds, Boston, from the New Haven Cemetery, and from several genealogies; column (3) is based on about 4,000 deaths, from the town records of Medfield, Dedham, Medford, Rehoboth, Newton, Northboro, Milton, Millbury, and Medway, and from several genealogies.

TABLE II.
EXPECTATION OF LIFE.

Summary of two life tables: (1) E. B. Elliott, Massachusetts, 1855; * (2) Massachusetts, 1893-97.†

Age.	(1)	(2)	
	Males and Females.	Males.	Females.
0	39.77	44.09	46.61
5	50.17	52.88	54.17
10	47.07	49.33	50.70
15	43.04	45.07	46.53
20	39.86	41.20	42.79
25	36.92	37.68	39.29
30	34.03	34.28	35.85
35	31.01	30.87	32.43
40	27.86	27.41	29.00
45	24.62	23.93	25.54
50	21.32	20.53	22.10
55	18.13	17.33	18.81
60	14.97	14.38	15.74
65	12.12	11.70	12.90
70	9.41	9.34	10.36
75	6.80	7.37	8.29
80	4.95	5.70	6.56
85	3.66	4.31	5.07
90	2.86	3.16	3.73
95	2.26	2.22	2.60
100	1.58	1.21	1.58

* Proceedings of the American Association, vol. xi, p. 51.

† Massachusetts State Board of Health Report, vol. 30, p. 822 (1898).

TABLE III.
DEATH-RATES BY AGES AT VARIOUS DATES IN MASSACHUSETTS.*

Age.	Years.				
	1865.	1875.	1885.	1895.	1900.
0-1	205.28	226.56	212.49	215.89	190.10
0-5	68.62	73.96	67.00	64.51	57.79
5-10	9.63	9.77	7.46	6.23	5.26
10-15	5.14	4.72	3.77	3.18	2.93
15-20	9.63	7.73	6.35	5.34	4.82
20-30	12.58	10.49	9.08	7.08	6.95
30-40	11.68	11.30	10.62	9.67	8.75
40-50	11.68	12.97	12.96	12.65	12.04
50-60	17.49	18.29	19.71	20.45	21.28
60-70	32.90	34.79	36.19	39.37	41.03
70-80	70.48	71.11	76.16	82.41	85.83
80-	168.23	176.41	182.32	184.65	197.82

* Massachusetts Registration Report, vol. lxx, p. 206.

TABLE IV.
SUMMARY OF REV. EDWARD WIGGLESWORTH'S MORTALITY TABLE FROM SIXTY-TWO BILLS
OF MORTALITY* (WITHOUT HIS CORRECTIONS FOR INCREASING POPULATION).†

Age.	Expect.	Age.	Expect.	Age.	Expect.
0	28.15	35	28.22	70	10.06
5	40.87	40	26.04	75	7.83
10	39.23	45	23.92	80	5.85
15	36.16	50	21.16	85	4.57
20	34.21	55	18.35	90	3.73
25	32.32	60	15.43	95	1.62
30	30.24	65	12.43	100	—

* Memoirs American Academy, Boston, 1793, vol. ii, p. 131.

† Wigglesworth's correction for the ages up to 15, inclusive, is omitted, so that the table may be strictly comparable with Table I, above, where no correction was possible.

TABLE V.

SUMMARY OF SURVIVAL COLUMNS FOR THREE DIFFERENT PERIODS FOR THE CITY OF BOSTON, PREPARED BY LEMUEL SHATTUCK.*

Age.	Number Surviving.		
	(1811-20.)	(1821-30.)	(1831-39.)
0-5	100.00	100.00	100.00
5-10	66.36	62.96	56.91
10-20	62.82	59.17	52.64
20-30	57.46	54.20	47.56
30-40	43.33	41.12	34.83
40-50	31.11	28.15	23.43
50-60	20.25	18.00	15.45
60-70	13.26	11.29	9.78
70-80	7.58	6.45	5.32
80-90	2.77	2.45	1.90
90-100 . . . . .	.36	.34	.35

* Vital Statistics of Boston, published by Lea & Blanchard, Philadelphia, 1841.

TABLE VI.

SYNOPSIS OF SEVERAL BILLS OF MORTALITY, BY REV. JOSEPH MCKEAN, PRESIDENT OF BOWDOIN COLLEGE.*

(McKean did not put his work into the form of a life table. He gave only the column headed "1x" below. The work of computing the expectation is given below.)

Age.	dx.	1x.	2Px.	2Qx.	Ex.
0-5	2,500	6,576	106,520	491,370	37.36
5-10	337	4,076	78,150	384,850	47.21
10-20	397	3,739	70,810	306,700	41.01
20-30	629	3,342	60,550	235,890	35.29
30-40	457	2,713	49,690	174,340	32.13
40-50	401	2,256	41,110	124,650	27.64
50-60	324	1,855	33,860	83,540	22.52
60-70	433	1,531	26,290	49,680	16.22
70-80	574	1,098	16,220	23,390	10.65
80-90	429	524	6,190	7,170	6.84
90-100	92	95	950	980	5.15
100—	3	3	?	?	?

* Memoirs American Academy, vol. ii, Part II, p. 66.

These data were collected from Roxbury, Marblehead, Stow, Brimfield, Westfield, East Kingston, Barnstable, Hamilton, Exeter, Salem, Edgartown, Beverly (first parish), Ipswich, Salisbury, Montague, Northboro, Hanover, Gloucester, Brookfield (third parish), Cambridge, Fryburg, Wenham, Wilmington, Northampton, Newbury, Reading, Weymouth, West Hampton, Hampton, Dover, Waltham, Newton, Falmouth, West Springfield, Hatfield, Ashburnham, Marblehead (second parish), for different periods, ranging from 1772 to 1790, approximately, with a few earlier records.

TABLE VII.

SUMMARY AND COMPARISON OF PREVIOUS TABLES.

(This table shows, first, the *order* of the values of the expectation of life for the various tables, beginning with the highest, and so on down, Nos. 1, 2, and 3 referring to Table I, columns (1), (2), and (3), No. 4 to the Wigglesworth table, No. 5 to Elliott's 1855 table, and No. 6 to the Board of Health's 1897 table; and, secondly, the *range* of the values of the expectation at each age,—i.e., the difference between the highest and the lowest. This table starts at age 15, as the values below that are too widely divergent to be significant, since the divergence is undoubtedly due to defects of record.)

Age.	Order.	Range (years).
15	1-6-2-5-3-4	11.41
20	1-6-2-5-3-4	9.22
25	1-6-2-5-3-4	7.44
30	1-6-5-2-3-4	5.70
35	1-6-5-2-3-4	4.01
40	1-6-5-2-3-4	2.72
45	1-6-5-4-3-2	1.64
50	1-6-5-4-3-2	1.52
55	1-4-5-6-3-2	1.58
60	1-4-6-5-3-2	1.45
65	1-4-6-5-3-2	1.27
70	1-4-6-3-2-5	1.33
75	1-(4-6)-2-3-5	.92
80	1-6-4-2-3-5	1.49
85	1-2-6-3-4-5	.90
90	1-2-4-6-3-5	1.16
95	2-1-3-6-5-4	1.88
100	5-6-3-1-2-	1.08

NOTES.

THE TWELFTH SESSION OF THE INTERNATIONAL STATISTICAL INSTITUTE AT PARIS, 1909.

The Twelfth Session of the International Statistical Institute occurred in Paris, July 4-10, 1909. In fact, it was opened informally on the evening of the 3d, when M. Levasseur gave a private reception to the members at the Collège de France.

The Institute was saddened by the death of its president, the distinguished Austrian, Dr. Karl Theodor von Inama-Sternegg, who since the death of its first president, Sir Rawson Rawson, in 1899, had presided over its deliberations. The duties of the presidency fell upon the vice-presidents, MM. Levasseur, Lexis, and Troinitsky, and especially upon M. Levasseur, as senior vice-president, chairman of the Committee of Organization and administrator of the Collège de France.

There were present 82 members of the Institute and 70 invited guests, or a total of 152, 54 of whom were official delegates from their respective governments, 31 members of the Institute, and 23 invited guests. Those who attended from the United States were Dr. W. R. Batt, Dr. W. H. Guilfooy, Dr. F. L. Pleadwell, Dr. Cressy L. Wilbur, Mr. W. F. Willcox, and Mr. F. L. Hoffman, the first five being delegates on the part of the Government to the International Commission for the Decennial Revision of the Classification of Diseases and Causes of Death which convened in Paris just before the session of the Institute, and the last two attending the session of the Institute as delegates from the United States.

The session opened formally on the morning of July 4, in the splendid Amphitheatre of the Sorbonne, under the presidency of the Minister of Labor, M. René Viviani, who welcomed the Institute in the name of the French Government. He paid fitting tribute to the deceased president, and dwelt upon the important relations between statistics and legislation.

M. Levasseur, as senior vice-president, responded on behalf of the Institute. His address dealt particularly with the responsibility of statisticians. He also referred to the deaths which had occurred in the ranks of the members since the preceding session; namely, those of Dr. von Inama-Sternegg, Professor Kauss, Mr. Hendriks, Mr. Wilson Fox, and Mr. Carroll D. Wright. Following this address, Dr. Lexis

read a paper on "Economic Crises." The meeting concluded with the organization of four sections: I. Methods and Mathematical Statistics; II. Demography; III. Economic Statistics; IV. Social Statistics. The section on Methods and Mathematical Statistics was an innovation, inaugurated mainly through the efforts of M. Lucien March.

Section I. was presided over by Professor Edgeworth as president and Signor Perozzo as vice-president. A paper by M. Waxweiler discussed the various fields in which statistics are now used, comprising meteorology, anthropology, psychology and biology, as well as economics. On his motion the section recommended that courses in the theory of statistics should be introduced into the programmes of work in biology and psychology, as well as in the social sciences. As a result, a committee on the teaching of statistics was appointed later in the session, with Mr. Bowley as chairman. As the outcome of a paper by M. March, "On the Application of Mathematical Processes to the Comparison of Statistics," a committee was appointed on technical methods of statistical comparison. Papers were also read in this section by Professor Edgeworth, on "The Applications of the Calculus of Probabilities to Statistics"; by Mr. Yule, on "The Applications of the Theory of Correlation to Social Statistics"; by Signor Perozzo, on "The Determination of the Age Distribution of Married Couples, given the Distribution of Ages at Marriage and the Law of Mortality"; and by M. Borel, on "Differential Methods."

In Section II.—Demography—Professor von Mayr was chosen president and Dr. Bertillon, vice-president. In reporting for the committee on the statistics of tuberculosis, Professor Lexis suggested that, in cases of death from that disease, inquiry should be made whether any other member of the family had died of the disease and that deaths should be classified according to the housing conditions of the family. The relation between tuberculosis and alcoholism in the various departments of France was discussed by M. Bertillon. He showed that the departments of northern and north-western France, where beer and cider are the common drinks and where the per capita consumption of alcohol is greatest, are just the departments in which tuberculosis is most prevalent. M. Nicolai presented the report of the committee on the fecundity of marriages and the number of children to a family. After recounting the resolutions adopted by the Institute at Copenhagen in 1907, he stated that the committee had prepared three models of questions and drafts of twelve tables. He said that the committee did not expect to impose the tables which it had outlined; it desired merely that the Institute should recommend them to statisticians. The inquiries recommended allow the establishment of distinctions in the censuses. The committee, he said, would be happy to see an attempt made at the distribution of families into social groups. Other papers

presented were: "Infant Mortality in France and in the Netherlands," by M. Huber and M. Methorst, respectively; "Urban Populations," by M. Meuriot; "The Census of Tokio and Kobe," by Mr. Yanagasawa; "Marriage and Divorce Statistics of the United States," by Mr. Willcox; "Statistics of the Blind," by Professor von Juraschek; and "The Distribution of the Sexes of Consecutive Children of the Same Mother," by M. March.

In Section III.—Economic Statistics—M. Yvès Guyot was chosen president and M. Raffalovich vice-president. M. Levasseur made a report on the course of corn prices in the various countries, and, after considerable discussion, the question was again referred to the Committee on Corn Prices. It was decided to get information as to the method of collecting data of prices in the United States and Canada, and some suggestions looking toward international uniformity were made. M. Raffalovich presented the report for the committee which had been appointed at Copenhagen to investigate bounties and subventions given by the different governments to navigation, commerce, agriculture, and industry. It was decided to continue the investigation. Mr. Kiaer made a report on the social distribution of incomes, and it was voted to continue this investigation further by means of a committee. A committee was also appointed to consider the establishment of a statistical record of state and municipal industrial undertakings. A communication was read by M. Bertillon on international statistics of inheritances. After a study of the statistics of France, Italy, England, Spain, Holland, and Rumania, he concluded that the proportion of persons leaving property at death is greatest in France. He raised the question as to whether the state of prosperity revealed in France by this study may not be one of the determining causes of the low birth-rate. In all of the principal countries, except Holland, small inheritances form the majority. He declared the statistics to be interesting for more than one reason, but that they could not be considered an index of the distribution of wealth. A paper was read by M. de Wendrich on "The Statistics of International Transportation." Though recognizing the difficulty of the undertaking, Mr. Zahn thought the Institute should make an attempt to secure statistics showing the financial systems, receipts, expenditures, liabilities, and wealth of all nations. After some discussion a committee was appointed to study the ways and means of establishing comparable international financial statistics, commencing with public expenditure.

The President and Vice-President of Section IV.—Social Statistics—were respectively MM. Delatour and Mataja. The Committee on Statistics of Industrial Accidents presented its report through M. Fuster. Considerable discussion followed, opinions differing about the possibility and desirability of securing greater details. Three forms of return sug-

gested by the committee were adopted "in principle." These and other proposals submitted to the General Assembly were indorsed by it, and the committee was requested to confer with the permanent Committee on Social Assurance and to report at the next session.

A report was given by M. de Lannoy on recent progress in criminal statistics in Belgium. M. Tissier reported reforms in criminal statistics of France, and M. Methorst spoke for the Netherlands.

Proofs of the first edition of a technological dictionary of industries and occupations, prepared by a committee appointed at the Copenhagen session, were presented. The work was undertaken by the French Government with the assistance of members from other countries, the work being published in French, English, and German. It was carried through chiefly by M. March, Dr. van der Borgh and M. Huber.

A committee was appointed in 1907 to prepare a dictionary of statistical terms in official publications. The committee reported that the first step was to prepare a list of all the terms used in the social sciences with the synonyms of each in the several languages, and after discussion the committee was requested to prepare such a list of the terms constituting the statistical vocabulary.

Dr. van der Borgh made an important suggestion for the establishment of an International Statistical Office under the direction of the Institute, by which a periodical bulletin should be published, giving in summary the important statistics of the various countries. He asked that a committee be appointed to investigate and report on this proposition. After considerable discussion a committee was elected by ballot as follows: MM. Bodio, van der Borgh, Fontaine, de Foville, Guillaume, Hanabusa, Julin, von Juraschek, Kiaer, Lange, Mandello, March, von Mayr, Raffalovich, Rew, Sir Llewellyn Smith, Sundbarg, de Vargha, Verrijn Stuart, Willcox, and Zolotareff. The committee organized by choosing M. de Foville as chairman, M. von Juraschek as vice-chairman, and as reporters MM. van der Borgh and Mandello.

The only American before the Institute as a candidate for membership, Dr. Cressy L. Wilbur, Chief Statistician for Vital Statistics in the Bureau of the Census, was elected.

The social events which add so much to the delight and also to the value of these biennial sessions, bringing together in frank and friendly intercourse many who before had been merely names to each other, were provided with the lavish and brilliant hospitality of which Paris and France are the synonym. A bald catalogue of them is all that can be added here. After the opening session on Sunday, July 4, the members and guests of the Institute with their ladies were received at the Palace of the Élysée by the President of the Republic and Madame

Fallières. On Monday evening the Committee of Organization gave a dinner. On Tuesday, after the general session of the morning, there was an excursion by rail to the beautiful château and Museum of Chantilly, luncheon being served on the way thither and tea on the return trip. On Wednesday the President of the Republic entertained some threescore guests at luncheon, and in the evening the Statistical Society of Paris held a session, followed by a banquet at which it was the host. On Thursday the scientific sessions were interrupted to give opportunity for a trip by special train to Rouen. After luncheon there the party divided into squads to see some of the delightful attractions in and near the ancient capital of Normandy, returning in the evening to Paris for a late reception at the palace of Prince Roland Bonaparte. On Friday after the sessions there was a brilliant reception at the Bank of France, followed by a gala-night at the opera, where "Samson et Dalila" was presented in honor of the guests. On Saturday the Society of Political Economy of Paris celebrated its twenty-fifth anniversary by a luncheon at the Pré Catelan; the Municipality of Paris in its turn received the guests at the Hôtel de Ville; and in the evening the farewell dinner was given by the Committee of Organization.

The three recent meetings of the Institute, at Berlin, London, and Paris, have all been marked by a brilliant profusion of social festivities, of which the foregoing enumeration conveys only a faint idea. They have been so devised and executed as by the very perfection of their arrangements to obscure the enormous labor involved in their preparation. In this respect the session at Paris, although unsurpassed by its predecessors, was yet obliged to follow in the lines they had laid down. In one particular it was unique, the personality of M. Levasseur. Whether he was presenting a scientific report at a section meeting, presiding over the general assembly, responding in the name of the Institute to the speech of welcome with a voice that perfectly filled the great amphitheatre of the Sorbonne, replying to a toast at a banquet, greeting old friends and making new ones at the social festivities, or welcoming all to his home at the informal reception which preceded the formal gathering, he exemplified the matchless charm of the French language in the hands of a master, the perfect hospitality and tact in which his nation are unrivalled, and the marvellous vigor which carried his more than fourscore years as if they weighed not a feather. The unique impression carried away from the session at Paris was the stimulus and the benediction all received from the senior vice-president.

WALTER F. WILLCOX.

A SHORTENING OF THE METHOD OF MAKING INTER-CENSAL ESTIMATES OF POPULATION.

In the course of a university lecture on an economic subject the following method was recently recommended for computing the population of a city in 1909, when the population figures for 1900 and 1905 are known: Take the ratio of increase between 1900 and 1905, and multiply the population in 1905 by four-fifths of that rate. This obviously amounts not to "assuming a constant rate of increase," but to assuming a constant geometrical progression between the censuses, and for intercensal points an arithmetical ratio. In other words, in terms of the graphic method, intermediate points are taken on the chords of the curve rather than on the curve itself. The *consistent* method of computing intercensal estimates on the basis of a constant rate is so simple, and its employment in correcting estimates, after the results of the approaching census are published, is likely to be so common, that the following method, used by the writer in computing a large number of intercensal populations, is given in the hope that it may prove useful:—

The common problem is this: Given the population of a community in 1900 and 1905, on a certain month and day, to find the population for the middle of the year (on which most rates are computed) for some year between the two, or for some year between 1905 and 1910. Suppose, for example, the population on July 1 (middle of year), 1907, is required. Proceed as follows: take the logarithms of the population in 1900 ($\log P$) and in 1905 ($\log P'$), subtract them, multiply the difference by 25/60 (because, assuming the 1900 and 1905 censuses, as usual, speak for June 1, there are 60 months from 1900 to 1905 and 25 months from June 1, 1905, to July 1, 1907), and add this product to the logarithm of the 1905 population, then take the antilogarithm of that result, which is the required population. The work of multiplying a number by 25/60 may be set down as follows: to multiply, say, 16764 by 25/60,—

$$\begin{array}{r}
 6)16764 \\
 \hline
 4 \\
 2794 \\
 67056 \\
 \hline
 6985.0
 \end{array}$$

This abbreviated method amounts, it will readily be seen, to putting the fraction 25/60 in the form $\frac{41}{6}$ and performing the indicated oper-

ation. ¶ When a multiplying machine is not available and a slide-rule will not give results accurate enough (as it frequently will not, especially when the estimates must check and agree as to totals), this short method saves considerable time. As most intercensal periods are five years, or 60 months, the denominator would usually be 60. It can be employed to advantage where it is desired to multiply by any fraction of the form $\frac{ab+1}{10b}$, where a and b are integers less than 10. A fraction can therefore be readily tested as to whether multiplying by it can be so shortened by subtracting one from the numerator, and noting whether the result is divisible exactly by the denominator divided by 10. This process is also useful where arithmetical estimates, rather than geometrical, are made, the only difference being that numbers are used instead of their logarithms.

In view of the confusion existing among many investigators of problems requiring statistical treatment, as to a correct and easy method for making population estimates, it seemed desirable to give the above.

HARRY A. RICHARDS.



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